TE CON 3

TEACHING ENGLISH AS A CONTENT SUBJECT AT THE TERTIARY LEVEL

THE TE-CON3 TEACHING GUIDE

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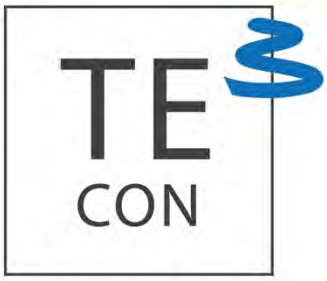

Teaching English as a Content Subject at the Tertiary Level

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The TE-Con3 Teaching Guide

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General Introduction

1.1 Foreword

Welcome to the TE-Con3 handbook, which is intended for General English language teachers at the higher education (HE) level, and for all classroom practitioners interested in innovating teaching and learning language through using content-based modules. We hope that you, the reader, will find the TE-Con3 approach and the modules presented below inspiring and motivating for your everyday teaching practice, and beneficial for your students' language learning. We also hope that the modules presented will contribute to students becoming effective critical thinkers and active participants in democratic discourse and citizenship.

1.2 Organisation of This Guide

The handbook has two parts. It has been designed to function as a guide for teachers to the TE-Con3 approach in part one, providing TE-Con3 teaching modules and materials in part two. In-depth explanations of pedagogy and step-by-step descriptions of classroom procedures have been included to facilitate modular content-based language teaching in HE. All modules and materials, which cover topics from five different academic fields, are available on the MUL-TECON platform, and are ready to use either online or offline.

1.3 What Is the TE-Con3 Project and What Is It About?

Teaching English as a Content Subject at Tertiary Level – A Modular Approach (TE-Con3) is a European project funded by the Erasmus+ programme of the European Commission aimed at developing an innovative methodology for teaching English in higher-education institutions by implementing content modules. The module topics reflect a broad spectrum of academic disciplines aimed at stimulating linguistic and academic development, while promoting education for cultural awareness and active citizenship.

TE-Con3 brings together seven international partner institutions from five different countries across Europe.[1] Throughout the project lifetime (2020–2023), the team conducted research and worked on various intellectual outputs (IOs), such as academic reports, an innovative conceptual framework for language teaching, open educational resources, and a web-based platform for the delivery of language teaching (TE-Con3 website, https://tecon3.wn.uw.edu.pl/intellectual-outputs/).

The project started with an empirically based needs analysis of HE English language teachers and extensive research on the role of English within European institutions of higher education; and in language policy briefs in the project partner countries (IO1). Aiming for a modular and content-driven approach to ELT in HE, nine basic underlying conceptual premises were identified (IO2) and described in terms of their relevance for teaching methods and classroom pedagogies, resulting in a theoretical framework informing all TE-Con3 modules (IO3). The Moodle-based platform MUL-TECON was set up to make all modules and materials accessible for teachers and students free of charge. The platform was designed to facilitate online and on-site teaching (IO4). The TE-Con3 handbook (IO5) is intended to support classroom

[1] Project coordinator: University of Warsaw (Poland); project partners: Tallinn University (Estonia), Humboldt-Universität zu Berlin (Germany), Łukasiewicz Research Network Institute for Sustainable Technologies (Poland), Warsaw University of Technology (Poland), University of Algarve (Portugal) and University of Piteşti (Romania).

teachers and online tutors while navigating through the modules and materials; and to optimise the potentialities for the content-based language teaching that TE-Con3 hopes to provide.

The table below gives readers an overview of the rationale for the TE-Con3 approach to teaching and learning English in higher education contexts. Based on a foundational distinction of educational domains – to know – to act – to value –, TE-Con3 builds on a set of nine key premises, which relate closely to well-established conceptual and theoretical frameworks from language education, applied linguistics and citizenship education. For a comprehensive and fully referenced introduction to the TE-Con3 model, its premises, and underlying theoretical concepts, please refer to the TE-Con3 framework document.

TE-Con3 addresses the educational domains …	**TO KNOW**	**TO ACT**	**TO VALUE**
TE-Con3 is …	multidisciplinary content-driven language-sensitive	culture-oriented glocal academic	task-based modular interactive & performative
The theoretical underpinnings of TE-Con3 are …	Multiliteracies & Pluriliteracies Bloom's taxonomy (revised version) Systemic Functional Linguistics	Intercultural Communication Patrick Moran's concept of Language for Culture Michael Byram's Intercultural Citizenship Model	Lexical Approach Post-method Approach Task-based Language Learning

Table 1: Educational domains and theoretical underpinnings of the TE-Con3 model

Based on these premises, five modules located in different academic domains were developed by the different teams. The following table presents the modules at a glance, the academic domain they are situated in, their topic content, and a selection of TE-Con3 premises most emphasised through each module.

module	**title / topic**	**TE-Con3 premises**
Architecture	*How to Architect?* *When a Building Says it All*	culture-oriented glocal language-sensitive
Art and Media	*Job Interviews* *Public Speaking*	interactive & performative language-sensitive task-based
Automotive Engineering	*From the Preindustrial Walking City to the Automobile City* *Smart Cities and Autonomous Vehicles*	culture-oriented glocal interactive & performative
Biomedical Sciences and Health Communication	*Ethics and Childhood Vaccination* *Bioengineering – Claiming God's Power*	academic culture-oriented language-sensitive
Geography	*The Tesla "Gigafactory" in Grünheide, Germany – An Economic Success at the Cost of an Ecological Disaster?*	glocal interactive & performative task-based

Table 2: TE-Con3 modules and theoretical premises highlighted

1.4 Materials and the MUL-TECON Platform

In the teaching guidelines of each separate module, it will be explained how the student materials provided in this manual and on the MUL-TECON platform can be used. Most lesson scenarios can be taught in different settings (online, on-site or as a blended course). Some materials can also be used for self-study.

The MUL-TECON platform is a Moodle-based learning platform designed to provide higher education English language teachers *and* learners with the TE-Con3 lesson scenarios. All modules, materials, and activities can be fully accessed through the MUL-TECON platform. The platform also hosts a wealth of online activities for learners to engage with domain-specific content and relevant linguistic material. It functions as a shared space for people and resources and has been designed to make collaboration easy. The platform allows for teaching through interactive online content and videos with no additional software required. MUL-TECON enables versatile delivery of the teaching modules in the classroom as it supports blended learning and complements on-site teaching with synchronous and asynchronous activities for students while they are navigating through each module.

On MUL-TECON, every module is organised as a Moodle course. Course teachers have the full Moodle functionality available at their fingertips for course management and assessment. Students and teachers are required to set up their accounts on the platform in order to participate in MUL-TECON courses, which is easy and convenient. Users may be enrolled in all of the five academic domains at the same time.

You can find the MUL-TECON platform here: https://tecon3.itee.radom.pl/login/index.php.

1.5 A Word from the TE-Con3 Project Team

TE-Con3 is a dynamic approach to English language teaching at the tertiary level. We hope that teachers find it an inspiring way to provide innovative classroom and online learning. Knowing that there is always room for improvement, we will always be happy to receive your feedback! Please, feel free to write to us with your ideas and suggestions at tecon3.contact@wn.uw.edu.pl.

Teaching Guidelines and Materials

2.1 Architecture

Unit 1 – How to *Architect*?

Unit 2 – When a Building Says It All

The aim of this module is to improve students' language system and discourse skills while at the same time familiarising them with chosen aspects of the academic domain architecture. The two units are designed to reflect the range of different angles from which the subject of architecture may be approached.

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2.1.1 Introduction

What is Unit 1 About?

The aim of Unit 1 is to improve students' discourse skills (reading, listening, speaking, writing) and language systems (grammar, lexis and lexico-grammar), while at the same time familiarising them with the essence and basic challenges of the architectural profession; and having them discuss and solve authentic, architecture-related problems (e.g., dealing with a controversial dormitory project).

Students will learn about the differences between a piece of architecture and a building, about the role the architect serves in society, about the main participants in the design process (the *architect*, the *public* and the *client*) and about the way their interests may come into conflict.

Students will be encouraged to actively engage with content materials by analysing and solving authentic problems, as well as relating them to their own contexts and/or future professions. Both students' knowledge and ability to communicate in a cohesive, precise, linguistically correct, and pragmatically appropriate manner should be assessed and focused on.

Thus, in line with the TE-Con3 premises, the unit aims at promoting *education for active citizenship* while stimulating linguistic and academic development across the three interrelated domains (see Mishra, 2013) – to KNOW (in this case: *architecture* and *language*), to VALUE (in this case: *the professional culture of architects*) and to ACT (in this case: *to pass judgement on* and *negotiate architecture-related issues*).

Unit 1 is language-sensitive in that the language needed to understand, summarise and evaluate architecture-related concepts is addressed. It is culture-oriented as it inspires interest in architecture and engages learners coming from different cultural backgrounds when it comes to negotiating its meaning and value. It is interactive & performative in that students engage in purposeful interaction aimed at analysing, negotiating and solving an authentic architecture-related problem.

Unit 1: Structure and Implementation

Unit 1 comprises five stages (*warm-up, introduction, analysing the problem, solving the problem* and *summing up*) and is intended for a minimum of 90 minutes of class time. It also includes extension / variation tasks for optional use at the discretion of the teacher.

The unit can be used on-site (as a collection of printable materials and MP4 files), online (as a complete unit for self-study, with incorporated instructions, hints, comments etc.) or for blended learning (with chosen online exercises set for homework), depending on the specific needs of the teachers and the students. All relevant materials are available on the MULTECON platform.

Unit 1: Language Level and Scaffolding Options

The module is suited for language levels B2–C1. The teaching materials are based on authentic texts and audio-visuals. Additional learning support is offered in the form of graphs, tables, photos, language tips, language exercises, and content information, collectively designed to

provide easier access to students, without overwhelming them with new information. It is up to the teacher (or in the case of online self-study, the student) to decide which of the scaffolding options they wish to use.

What Is Unit 2 About?

The aim of Unit 2 is to make the students aware of the cultural implications of the space which surrounds them, be it in their everyday surroundings, or on holidays. The unit focuses on the way people interact with each other, build communities and travel to show how all of those activities are deeply interconnected with the space that they are performed in.

Building on the students' individual experience visiting other cultures, the unit will offer new insights into a foreign culture using Chinese architecture as an example. Students will be encouraged to explore the details of Chinese culture via the traditional and modern style of buildings and to creatively think of ways to classify them. Critical thinking and comparison of practices varying across cultures are both welcome, as theories of culture are included in Worksheets 6, 7, and 8. Finally, the last tasks offered in the unit (Worksheet 9) can be used as a chance to solidify the newly accumulated knowledge.

Unit 2 is glocal and culture-oriented in its attempt to look at the global problem of seeking sustainable architecture from the perspective of local cultures and communities. It offers a detailed account of Chinese traditional buildings still being used and engages the students in a theory-based discussion on the components of visible culture, which makes it academic.

Unit 2: Structure and Implementation

Unit 2 comprises five stages (*warm-up, introduction, exploration, academic practice, consolidation*) and forms a complete whole to be used during a 90-minute lesson. It also features a series of extension / variation tasks, with options to extend the material (up to three 90-minute lessons). The class can be conducted either on-site, online, or in blended learning mode with some tasks done asynchronously on the MULTE-CON platform, e.g., with links provided in the guidelines for teachers.

Unit 2: Language Levels and Scaffolding Options

The assumed language level of students is B2–C1. However, materials for different stages can be also adapted to the needs of B1 students if need be. Exercises and activities are based on authentic texts. Additional content information, for example details on the presented types of buildings, or references to academic literature, is also available for teachers and students.

2.1.2 Teaching Guidelines Architecture

Unit 1: Teaching Guidelines

Topic: How to *Architect*?[1] The Essence and Basic Challenges of the Architectural Profession

Level: B2–C1

Skills: speaking, listening, reading, writing (integrated)

Timing: ~ 90 min. of study (plus possible extension / variation activities)

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. understand the difference between a building and a piece of architecture. ✓ Ss. understand the complexity of architects' obligations and the conflicting interests inherent in a design process. ✓ Ss. know language to acquire / summarise and evaluate architecture-related concepts.	✓ Ss. have a better understanding of the professional culture of architects. ✓ Ss. can satisfy communicative needs when dealing with other professional cultures.	✓ Ss. can analyse and pass judgement on an architecture-related conflict. ✓ Ss. can negotiate architecture-related issues and reach a compromise.

[1] While the word "architect" is a noun, it has been popularised as a verb by Dough Patt – an architect, academic, writer and creator of popular videos about architecture – who uses it on his website, YouTube channel, and in his book. (2012). *How to Architect*. MIT Press. As he explains: "Against those who would say build, but do not use an architect, this book is a defiant verb. Architect!" (2012, xii)

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. warm-up	~ 10 min	pair work / group work
2. introducing the problem	~ 35 min	pair work / group work / individual work
3. analysing the problem	~ 20 min	pair work / group work / individual work
4. solving the problem	~ 20 min	pair work / group work / individual work
5. summing up	~ 5 min	group work

Materials

- Material 1: Worksheet – *Architecture vs. Buildings*
- Material 2: Worksheet – *Le Corbusier*
- Material 3: Worksheet – *Architects vs. Other Professions*
- Material 4: Worksheet – *Ethics in Architecture*
- Material 5: Video – *Ethics: From Building to Architecture*
- Material 6: Worksheet – *Additional Reading & Grammar Practice*
- Material 7: Worksheet – *Megadorm*
- Material 8: Worksheet – *Discussion Phrases*
- Material 9: Worksheet – *Discussion Phrases & Role Cards for Discussion*

STAGE 1 – WARM–UP

Objectives

content objectives	language objectives	culture objectives
✓ to personalise the content ✓ to activate existing schemata for the content	✓ to expand / recall language to talk about architecture (vocabulary) and use it in conversation	✓ to identify and articulate preconceptions about architecture

Suggested Procedure

1. To introduce the topic, the teacher tells students that they should share their ideas about architecture, and then distributes Material 1.

2. Students look at the worksheet and, in pairs, discuss the questions.
3. The teacher monitors the activities, helps with content and language, and notes down both good language use and common mistakes.
4. Students share their answers and opinions with the whole class, the teacher writes key ideas and useful phrases on the board. In the case of incorrect language use, the teacher elicits correct phrases (based on the notes taken while monitoring).

Extension / Variation

The teacher may use Material 2 and/or Material 3.

Teacher's Notes

According to one definition a building is "any permanent structure which provides shelter, encloses space and can be occupied by people, animals, goods or services" and a piece of architecture is "the product of the art and science of producing a built form." (Davies & Jokiniemi, 2008).

The idea for the activity comes from: *101 things I Learned in Architecture School*, written by Matthew Frederick (2007), a practising architect and academic who looks to addressing the central questions of architectural education. The conclusion – not disclosed in the exercise – reads: "A duck is a building that projects its meaning in a literal way. With regards to Robert Venturi." Robert Venturi is an architect who is an advocate of the so-called duck architecture (a term he coined) – i.e., highly sculptural forms which represent products or services available within (e.g., picture A – the headquarters of a company that produces wooden baskets, picture B – a shop selling ducks and eggs, picture C – a house for a shoe seller). Duck architecture is scorned by some architects (including the book's author) and considered as kitsch.

Figure 1: Duck architecture

Materials

- Material 1: Worksheet – *Architects vs. Buildings*
- Material 2: Worksheet – *Le Corbusier*
- Material 3: Worksheet – *Architects vs. Other Professions*

Answers

Material 1: Worksheet – *Architects vs. Buildings*

possible answers (open to interpretation):
Figure 1 – a building / picture 2 – a work of architecture *and* a building
Figure 2 – caption b. / picture 2 – caption a.

Material 2: Worksheet – *Le Corbusier*

Open answers: The quote is Le Corbusier's reply when he learned that the housing project he had designed had been altered by its inhabitants.

Material 3: Worksheet – *Architects vs. Other Professions*

All the qualities that are mentioned are useful for a practising architect, as it is a very versatile profession, requiring a combination of technical, artistic, psychological, and business skills.

STAGE 2 – INTRODUCING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to familiarise Ss. with common tension points and main parties involved in a design process ✓ to familiarise Ss. with architects' main obligations	✓ to expand genre-specific and general Academic English (needed to understand / talk about the topic) ✓ to practise using present perfect for relating to non-past / future time ✓ to practise listening / watching for specific information ✓ to practise reading strategies (identifying text cues)	✓ to help non-architects understand and relate to the challenges inherent in the architectural professional culture ✓ to identify points of contacts between Ss.' future professions and the architectural profession

Suggested Procedure

1. The teacher tells students that they will watch a video in which practising architects explain the challenges they face.
2. Students work individually on exercise 1 (Material 4) and then compare in pairs / the teacher checks and elicits / clarifies meaning of collocations. ~ 5 min
3. Students work individually on exercise 4 and then compare in pairs and relate back to class / the teacher checks. ~ 10 min

4. Students work individually on exercise 5 and then compare in pairs and relate back to class / the teacher checks. ~ 10 min
5. The teacher plays the MP4 (Material 5) / students do exercise 6 individually, then compare in pairs and relate back to class / the teacher writes key ideas / useful phrases on the board. ~ 10 min
6. Exercise 2 is intended for homework and exercise 3 for HW follow-up (the following class).

Extension / Variation

More advanced groups may not need to watch the MP4 again before doing exercise 5.

As a follow-up for exercise 1 (Material 4), the teacher may ask the students – once they have watched the video – to compare their initial ideas with what they learned / heard.

The teacher may use Material 6 which zooms in on the linguistic aspect of the material used so far. If time is short, the teacher may decide to do some of the exercises during class work or set it all for homework (either as a handout to be checked the following class *or* as an interactive Moodle task for student self-work).

The aim of exercises 2 and 3 (Material 6) is to sensitise students (using real-life examples from the content material they studied earlier) to the fact that the present perfect tense is used not only to relate the action / state to the time before NOW, but also to a more general notion of NON-PAST time (which is often FUTURE – see exercise 2). And this, in turn, determines the choice of articles (see exercise 3, examples a. and b.).

Materials

- Material 4: Worksheet – *Ethics in Architecture*
- Material 5: Video – *Ethics: From Building to Architecture*
- Material 6: Worksheet – *Additional Reading & Grammar Practice*

Answers

Material 4: Worksheet – *Ethics in Architecture*

Exercise 1

1. to provide	*g. shelter*
2. to practice	*f. a profession*
3. sufficient	*c. income*
4. conflicting	*b. requirements or a. interests*
5. to serve	*h. the public*
6. to offer a welcome splash	*e. of cold water*
7. competing	*a. interests or b. requirements*
8. to step	*i. back*
9. to come up	*d. short on your goals*
10. to walk	*j. the walk*

Exercise 2

a) There are a lot of conflicting requirements / competing interests inherent in my future profession, such as…

b) I am sure that my future job will guarantee a sufficient income to provide for my family.

c) The last time I came up short on my goals was when I failed to achieve my objectives because….

d) I often talk big, but I can back it up too! I definitely talk the talk but also walk the walk.

e) The main obligation of every architect is to provide shelter / to serve the public.

f) When I encounter problems, it is easy for me to step back and identify my strengths and weaknesses.

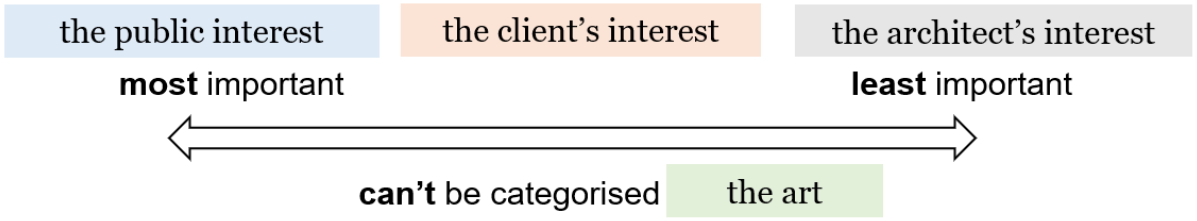
Exercise 3

open answers

Exercise 4

building functions	tension points in architects' careers
provide shelter express desires of culture and society	serve the public serve the client provide for the architect and their family produce art

Exercise 5



Material 6: Worksheet – *Additional Reading & Grammar Practice*

Exercise 1

Answers and hints for the students below (the teacher may use the hints to help the students do the task)

(1) E

hint: The next sentence elaborates on the idea that 'buildings speak' and explains how they do so.

(2) B

hint 1: This sentence comes at the beginning of a NEW paragraph and, therefore, talks about something different in nature.

hint 2: A definite determiner 'this' is used in the following sentence (in 'this devotion'), so the idea must have been introduced in the preceding sentence.

(3) F

hint: The preceding sentence explained what architectural ethics is NOT, the next sentence explains what it IS.

(4) C

hint: The next sentence explains what it takes to 'walk the walk', it also refers back to the idea introduced in the preceding sentence by using a definite pronoun 'this' + a reformulation of the idea expressed here.

Exercise 2

time before NON-PAST / FUTURE

Exercise 3

(a) a / has provided / time before NON-PAST / FUTURE
(b) The / has provided / time before NOW
(c) had partly disillusioned / time before PAST

STAGE 3 – ANALYSING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to deepen content knowledge by having Ss. analyse a content-related problem	✓ to expand genre-specific and general Academic English (needed to understand / talk about / summarise the content) ✓ to practise reading for gist	✓ to show the social impact of architecture-related decisions

Suggested Procedure

1. The teacher tells the students that they are about to analyse an architecture-related problem.
2. The students do exercise 1 from Material 7 individually / compare in pairs / the teacher checks and elicits / explains meaning of collocations. ~ 5 min
3. The students work individually on exercise 2, then compare in pairs and relate back to class / the teacher checks. ~ 10 min
4. The students work in pairs on exercise 3, report back to class / the teacher collects ideas / useful phrases on the board. ~ 5 min

Extension / Variation

With more advanced groups, exercise 1 may be skipped / done as revision the following class.

Once they have read the text, as a follow-up on exercise 1, the teacher may ask the students to compare their initial ideas with what they learned / read.

Materials

- Material 7: Worksheet – *Megadorm*

Answers

Material 7: Worksheet – *Megadorm*

Exercise 1:

1. student	*f. dormitory*
2. to go	*a. viral*
3. cutting	*d. edge*
4. to maximise	*b. use of space*
5. common	*i. areas*
6. review	*g. committee*
7. to back	*e. down*
8. a game of	*c. trade-offs*
9. set	*h. in stone*

Exercise 2

The University of California needs to decide whether it will accept a donation from Charlie Munger. The decision is difficult because, on the one hand, the billionaire is offering to sponsor the construction of a dormitory that will house 4,500 students – and the university needs more on-campus housing. On the other hand, the dormitory that Munger has agreed to build is controversial, as 94 percent of its rooms will not have windows.

Exercise 3

(possible answers)

(a) building – the person who designed it is not a qualified architect – therefore, it is not "the product of the art and science of producing a built form."

(b) architect = Munger, client = university, user / public = students

(c) the architect's interests are favoured over the client's interests and the client's interests are favoured over the public's interests

STAGE 4 – SOLVING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to deepen content knowledge by having Ss. solve a content-related problem	✓ to expand and put to use academic language of discussing	✓ to practise negotiating & reaching consensus despite conflicting views / different professional backgrounds

Suggested Procedure

1. The teacher tells the students that they are about to discuss and solve an architecture related problem.
2. The students work individually on exercise 1 and exercise 2 (Material 8) / compare in pairs / the teacher checks and elicits / clarifies meaning. ~ 5 min
3. The students work individually on exercise 1 (Material 9) / report back to class phrases that are new to them.
4. The teacher divides the students into groups of four and explains the task (exercise 2) / The teacher distributes role cards (the teacher may decide to do it randomly or take into account students' natural predispositions / language level).
5. The students read their roles, whereas the teacher explains any unclear words (e.g.: make concessions). The teacher sets a time limit for some sort of compromise to be reached.
6. The students do the role-play, and the teacher monitors and collects useful language use / common mistakes. After the students have finished and presented their solutions – the teacher gives feedback on language use. ~ 15 min

Extension / Variation

With more advanced groups exercise 1 and exercise 2 (Material 8) may be skipped / done as revision the following class.

As a follow-up for Material 8, the teacher may ask students to compare the lists of phrases in exercise 1 (Material 9) with their initial ideas.

With mixed-ability groups or if running out of time, the teacher may distribute role cards for exercise 2 (Material 9) and ask the students to prepare for the discussion at home and do the role-play the following class.

As a follow-up to exercise 2 (Material 9), the students and the teacher may vote whose solution they like best (the teacher may prepare a poll).

Materials

- Material 8: Worksheet – *Discussion Phrases*
- Material 9: Worksheet – *Discussion Phrases & Role Cards for Discussion*

Answers

Material 8: Worksheet – *Discussion Phrases*

Exercise 1

a. A critical element of the solution to this problem is… **S**
b. Am I correct in assuming that… **I**
c. Another way of looking at this problem is… **P**
d. Could you expand a little bit on what you said about… **I**
e. I know I have solved the problem because… **S**
f. If I have understood you correctly, your point is that… **I**
g. In order to solve this problem, we must first / initially **P**
h. One way to visualise this problem is… **P**
i. Sorry, but I'm not quite clear on… **I**
j. The most important thing to remember with this problem is… **P**
k. The solution to this problem will require… **S**
l. We know our solution is correct because… **S**

Exercise 2

Affirming (**D**) Disagreeing (**B**) Expressing an Opinion (**E**) Holding the Floor (**F**) Offering a Suggestion (**C**) Reporting a Group's Idea (**A**)

STAGE 5 – SUMMING UP

Objectives

content objectives	language objectives	culture objectives
✓ to summarise what Ss. have learnt content-wise	✓ to summarise what Ss. have learnt language-wise	✓ to pull the class together and end on a positive note

Suggested Procedure

The teacher asks students to volunteer and share with the class:

1. one thing that they learnt during the class in terms of language (e.g., a specific phrase, reading strategy);

2. one thing that they learnt during the class about architecture;
3. one thing (other than language & architecture) that they learnt during the class (e.g., about other students).

Unit 2: Teaching Guidelines

Topic: When a Building Says It All – Experiencing Culture through Architecture

Level: B2–C1

Skills: speaking, reading

Timing: ~ 90 min. of study (with additional activities available on MUL-TECON)

Planned Learning Outcomes:

	TO KNOW	**TO VALUE**	**TO ACT**
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. can understand how culture can manifest itself in multiple ways, including architecture. ✓ Ss. can describe and discuss culture- and environment-specific elements of Chinese architecture. ✓ Ss. can recognise and use elements of architectural jargon in meaningful exchanges on the topic of Chinese architecture.	✓ Ss. appreciate the complexity of culture and exercise caution when speaking of foreign cultures. ✓ Ss. are aware of the diversity of architectural objects, generalising on the basis of Chinese examples. ✓ Ss. apply a general analytical tool (Moran's model) to formulate observations about a specific phenomenon (examples of Chinese architecture).	✓ Ss. can conduct a targeted analysis of diverse source materials. ✓ Ss. are able to extract key facts and seek further information. ✓ Ss. can present the results of their analysis and engage in spontaneous exchange related to newly acquired content.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. warm-up	~ 10 min	pair work / group work
2. introduction	~ 20 min	pair work / group work / individual work
3. exploration	~ 25 min	individual work
4. academic practice	~ 25 min	group work / individual work
5. consolidation	~ 10 min	group work

Materials

- Material 10: Worksheet – *The Significance of our Architectural Environment*
- Material 11: Worksheet – *Useful Vocabulary to Describe Buildings*
- Material 12: Worksheet – *Pictures Presenting Various Types of Buildings*
- Material 13: Worksheet – *Types of Chinese Traditional Architecture*
- Material 14: Worksheet – *Exercises to the Text on Chinese Traditional Architecture*
- Material 15: Worksheet – *"A Theory of Culture" by Patrick Moran*
- Material 16: Worksheet – *Practical Application of Patrick Moran's Diamond Diagram of Culture*
- Material 17: Worksheet – *Polish Traditional Architecture in Kurpie Region*
- Material 18: Worksheet 18 – *Architecture and Tourism*

STAGE 1 – WARM-UP

Objectives

content objectives	language objectives	culture objectives
✓ to express personal opinions concerning the content ✓ to activate existing schemata for the content	✓ to expand / recall content-related language (vocabulary / formulae) ✓ to identify linguistic needs related to the topic	✓ to identify and articulate preconceptions about architecture and culture ✓ to probe for stereotypes which could affect Ss.' formation of views related to the topic

Suggested Procedure

1. This teacher tells the students that the topic of the class will be related to culture, stressing the need for cautious and respectful opinion-forming.
2. Next, the teacher presents the quote from Louis Kahn: “Even a brick wants to be something,” and asks students about their interpretation of the quote.
3. The discussion can be further directed towards the problem of the universality of such quotes vs. their cultural bias, e.g., “Is a brick such a universal material that it can be treated as representing a fundamental building block?” “Can you think of a more representative material for other cultures?”.
4. The students discuss the given topic in pairs, preparing to give a brief account of their exchange to the class.
5. During the discussion, the teacher can provide further details about Louis Kahn (photo of a building and bio note – depending on whether there is room for such an addition (Material 10).
6. The teacher monitors and helps with content and language and encourages personal take on the tasks.
7. The students share their answers and opinions with the whole class, the teacher writes key ideas, useful phrases on the board.

This activity is meant to activate the students’ previous knowledge and linguistic resources and to get them engaged in the topic of architecture as part of the culture. For this reason, the discussion should encourage personal responses to the topic and feature examples from students’ own experiences. The convictions voiced at this stage will subsequently be elaborated on (reinforced or challenged) by the example of Chinese architecture given in the handouts with the reading prompts. If possible, the teacher may find it helpful to establish if the students have had any previous experience with Chinese architecture.

Extension / Variation

The teacher may use Material 10. If there is enough time or the activity seems to provoke significant involvement from the students, the teacher can encourage sharing and discussing some pictures of the most inspiring objects of architecture. Students come up with examples to support their arguments. Thus, the exercise can be turned into a longer one and deemed as part of the “introducing the problem” stage of the lesson.

Materials

- Material 10: Worksheet – *The Significance of our Architectural Environment*

STAGE 2 – PRESENTATION PHASE

Objectives

content objectives	language objectives	culture objectives
✓ to practise analytical skills (categorization)	✓ to practise speaking in front of others ✓ to practise summarising arguments ✓ to practise speaking in relation to visual materials	✓ to make Ss. aware how some universal functions are realised in a culture-specific way (e.g., housing, representation, etc.)

Suggested Procedure

1. This teacher distributes Material 11 with a lexical task in the form of a printout with a table of three types of vocabulary, giving the instruction to put vocabulary items in the correct column (also available on MUL-TECON). If necessary, the teacher makes sure that all students know the words in the table.
2. Next, the teacher divides the students into groups of 3–6 persons. Each group should get a set of pictures given in Material 12.
3. The teacher explains the main task – some groups should arrange the pictures of architectural objects in two categories of their choice; other groups should do the same, but in three categories of their choice. The groups should be ready to explain what criteria they have chosen and why they believe them to be relevant. Sample criteria: material (brick / wooden), function (secular / religious), time (modern / traditional).
4. The teacher monitors the students' performance, encouraging them to use the introduced vocabulary.
5. The students present the results of their work in front of the class. The teacher can ask clarifying questions and provide useful phrases or vocabulary items to precisely describe the content of the pictures.

This stage of the lesson is intended to provide the students with the vocabulary necessary to successfully work with the topic on the relations between architecture and culture. The complex conceptual task of categorization should help engage students by providing a challenge with many good solutions. By working with the materials about Chinese architecture, students are expected to develop an interest in the factual information introduced at the next stage. The division into three equally meaningful categories may be a little more challenging than the division into two categories and the teacher may wish to take this into consideration by giving it to a larger group.

Teacher's Notes

Figure 1: Opus Hong Kong

Opus Hong Kong is a 12-storey, 42.62 m residential high-rise completed in 2012 in Hong Kong. The project was designed by Frank Gehry in collaboration with Ronald Lu and Partners. It was his first Asian residential project, which consists of 12 residential units.

Figure 2: Diaojiao

This stilted building (also called Diaojiao Lou in Chinese) is located in Sichuan Province in Southwest China. Stilted buildings are traditional dwellings of the Chinese ethnic groups like Miao, Buyi, and Tujia. They are usually built along mountains and rivers and oriented to the west or east in order to capture more sunlight.

Figure 3: Yuyuan Garden

Yuyuan Garden is an extensive Chinese garden located beside the City God Temple in the old town of Shanghai. It abuts the Yu Garden Bazaar. Rumours about its origin include the story that it was meant for the Huizong Emperor (Northern Song Dynasty, from 1100 to 1126 AD), residing at the imperial palace in Beijing. According to the same legend it was salvaged from the Huangpu River after the boat carrying it had sunk.

Figure 4: Tolou

Tulous are Chinese rural dwellings unique to the Hakka in the mountainous areas of south-eastern Fujian, China. They were mostly built between the 12th and the 20th centuries. A tulou is usually a large, enclosed and fortified earth building, most commonly rectangular or circular in configuration. The top level of these buildings has gun holes for defensive purposes.

Figure 5: Horse Head Wall

The Horse Head Wall is an important feature of Chinese Huizhou architecture. In villages where people live together, the density of residential buildings is relatively high, which is not conducive to fire prevention. Therefore, the horse head wall, which is made of stone and soil, is also called the fire wall.

Figure 6: Chongqing

It is an ordinary dwelling in rural Chongqing. This kind of building is often found in mountainous areas of southwest China. They are often surrounded by mountains and located at the foot of mountains. Due to the rainy climate in southwest China, the roofs (see the picture) help drainage.

Figure 7: The forbidden city

The Forbidden City is one of the largest and most well-preserved ancient wooden structures in China, surrounded by numerous opulent imperial gardens and temples. It was the residence of the Emperor of China from the Ming dynasty to the end of the Qing dynasty, which served as the ceremonial and political centre of Chinese rule for over 500 years.

Figure 8: Yao Dong

Yao Dong is a particular form of earth shelter dwelling commonly found in the Loess Plateau in north China. They are generally carved out of a hillside or excavated horizontally from a central sunken courtyard. The earth that surrounds the indoor space serves as an effective insulator, keeping the interior of the structure warm in cold seasons and cool in hot seasons.

Extension / Variation

Point 1 in the procedure can be easily relegated to MUL-TECON and the students will be asked to do the task online in the classroom or given it as preparatory homework.

If classroom conditions allow it, this activity can be extended to have the students produce a poster; this option would have them work with multimodal means to present the information about their selected logic of categorization.

The teacher may also ask the students to relate their present findings to the opinion they expressed at the previous lesson stage (Is the quote universally applicable or limited to a particular context?); they may be asked if they would maintain their view or change it.

Materials

- Material 11: Worksheet – *Useful Vocabulary to Describe Buildings*
- Material 12: Worksheet – *Pictures Presenting Various Types of Buildings*

Answers

Material 11: Worksheet – *Useful Vocabulary to Describe Buildings*

materials	building types	functions
wood	temple	palatial
brick	palace	religious
stone	skyscraper	funerary
metal	shack	residential
pottery	tower	imperial
soil	terraced house	vernacular
glass	tenement house	secular

Material 12: Worksheet – *Pictures Presenting Various Types of Buildings*

Examples of possible divisions:

two-fold division:

by function:	buildings for personal use: pictures 1, 2, 4, 5, 6, 8
	buildings public use: pictures 3, 7
by time:	modern buildings: picture 1
	ancient buildings: picture 2, 3, 4, 5, 6, 7, 8

three-fold division:

by surroundings:	buildings surrounded by water: picture 2, 3
	buildings surrounded by hills: picture 1, 6, 8
	building surrounded by woods: picture 4, 5
by material:	buildings constructed with wood: picture 2, 3, 7
	buildings constructed with soil: picture 4, 8
	buildings constructed with stone: picture 1, 5, 6

STAGE 3 – ANALYSING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to learn about traditional Chinese architecture types and their relationship to the environment	✓ to get familiar with architectural-cultural discourse ✓ to practise the passive voice ✓ to practise verb complementation patterns	✓ to understand how environmental and social factors impact architecture, and how their relationship is manifested in a particular culture (Chinese)

Suggested Procedure

1. The teacher should start by making a connection to the previous stage, highlighting the fact that caution should be exercised when dealing with culturally loaded content and encouraging the pursuit of additional information on sensitive topics.
2. Next, the students are requested to complete exercises on worksheets (Materials 13 and 14). The first part of the activity is focused on content, the second on language.

In the previous activity, students were requested to interact with culturally foreign material. Now, they will find out more about Chinese architecture. This should support the idea of further exploring information we consider interesting or culturally sensitive. It should also promote caution and moderation when passing value judgments on foreign objects or concepts. The second substage is focused on language so as to make the students aware that particular fields have specific linguistic equivalents, which are worth learning if one wishes to become competent in any field.

Extension / Variation

Both parts of this stage can be carried out alone on MUL-TECON. This may be advisable if the teacher decides more time should be spent on other activities of this unit.

Materials

- Material 13: Worksheet – *Types of Chinese Traditional Architecture*
- Material 14: Worksheet – *Exercises to the Text on Chinese Traditional Architecture*

Answers

Material 13: Worksheet – *Types of Chinese Traditional Architecture*

architecture type	geographic region	materials used	usage	features
siheyuan	Beijing, North of China	wood and brick	yard house for multi-generational living	made up of four rectangular buildings arranged in a square to create an inner courtyard
tulou	Fujian, Southeast of China	soil and wood	residences of the Hakka people	cylindrical walls that reach several stories high in a once-necessary effort, the outward facing walls have only one entrance and no windows, and all balconies, doorways, and openings face inwards
yaodong	Shanxi, North of China	soil and stone	dwelling for a single clan or extended family	use earth from the hillside as insulation to regulate the temperature in harsh winters or hot summers, carved into a hillside

Material 14: Worksheet – *Exercises to the Text on Chinese Traditional Architecture*

Task A

1. Rapid urbanisation in China has favoured high-rise apartment towers over traditional housing because of their ease of construction and the number of residents they can contain / their population capacity.
2. This is by no means an exhaustive list.
3. They are set up for multi-generational living.
4. A reflection of how highly the notion of community is regarded by the designers of the tulou, something that can also be observed in the building's egalitarian round shape.

5. The last decade has seen a newfound appreciation for the economic and environmental benefits of yaodong living.

Task B

1. recognise
2. is connected by
3. apartment blocks to siheyuan.
4. Unlike
5. is driven
6. influences / is influenced by (both options are correct, and this can spark discussion)

STAGE 4 – SOLVING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ Ss. learn about new ways to describe culture – Moran's model of culture. ✓ Ss. categorise prior knowledge in terms of new schema.	✓ Ss. can generalise and speculate.	✓ Ss. can look at elements of culture. ✓ Ss. reflect on architecture as an artefact of culture.

Suggested Procedure

1. The teacher should first lead a discussion on new ways to conceptualise culture (Moran's diamond – Material 15).
2. The students fill in the table in exercise 4 given in Material 16 according to the example. They can consult the previous material (Material 13).
3. The students and the teacher discuss their results together according to the example they chose.

Extension / Variation

Material 17: Worksheet – *Polish Traditional Architecture in Kurpie Region*

Materials

- Material 15: Worksheet – *"A Theory of Culture" by Patrick Moran*
- Material 16: Worksheet – *Practical Application of Patrick Moran's Diamond Diagram of Culture*
- Material 17: Worksheet – *Polish Traditional Architecture in Kurpie Region*

Answers

Material 15: Worksheet – *"A Theory of Culture" by Patrick Moran*

A passage by Patrick Moran (2006) on some possible implications of such an interpretation of culture and its elements:

The evolving way of life reflects the dynamic nature of culture – that there is a history and tradition to the products, practices, perspectives, and the communities of the culture. It also stresses that the persons of the culture are in the process of actively creating and changing products, practices, perspectives, and communities. [...]

For example, a cultural phenomenon such as law enforcement can be approached from the point of view of an individual police officer including the officer's own unique experiences and outlook on work. It can be seen from any of the activities they (depending on the culture) undertake as part of their work (practices) such as directing traffic, patrolling a beat, making arrests, gathering evidence, resolving disputes. It can be seen from the things the officer uses (products), such as handcuffs, tickets, badges, two-way radios, accident report forms, or from the institutional structures the officer works within, such as the local government, the judicial system, the police union, or community service organisations, and from the physical settings where he or she works, such as the police station or the neighbourhood the officer patrols. It can be seen from explicit values or beliefs (perspectives) that underlie police work, such as views of law and order, civic duty. Finally, it can be seen from the social circumstances in which the police officer plays a role (communities), like the neighbourhood, fellow officers, the police station, or the professional organisation of police officers.

Material 16: Worksheet – *Practical Application of Patrick Moran's Diamond Diagram of Culture*

products	practices	perspectives	persons	communities
tulou	An entire clan lives together in a building. Each building functions as a small village. Individual residences within the tulou were divided equally. The tulou is built in round shape.	The same surname and clan should live together to protect themselves from attack, and adhere to a common guarded culture, to customs and beliefs. Tulous are divided equally among their inhabitants in an egalitarian fashion.	Individual people living in a tulou and the clan leader	the Hakka ethnic group in Fujian, China

products	practices	perspectives	persons	communities
yaodong	A yaodong is carved into a hillside and dug into the ground to create a sunken dwelling or built as a standalone structure by packing earth on top of a brick frame.	Human beings and nature are interdependent. Human survival is closely linked with the environment.	People living in a yaodong	China's northern provinces

Material 17: Worksheet – *Polish Traditional Architecture in Kurpie Region*

products	practices	perspectives	persons	communities
wood as local material, wreath made of tree branches	wreath hanging, dances as a form of celebration	wood as local material building as a ritual	homeowners, neighbours, carpenters, priest	the village people, local community, Kurpie region

STAGE 5 – CONSOLIDATION

Objectives

content objectives	language objectives	culture objectives
✓ Ss. can distinguish features of traditional architecture. ✓ Ss. can distinguish different profiles of tourists and name them.	✓ role-playing as a means to change registers (tourist / tour operator) ✓ adjusting the language depending on the type of features are drawn (randomly)	✓ seeing culture as an asset

Suggested Procedure

1. The exercise will involve two parties; the teacher should start by explaining the roles of friends:
   a. One friend has recently been to China on a professional, architecture-related trip, where they got to know the traditional architecture types.
   b. The other friend is arranging a trip to China for recreational purposes and will try to learn what to see, based on their preferences.
   c. Student a above should draw on the knowledge acquired in the course of the unit. Student b above should draw 3–4 cards to characterise their preferences.
   d. Any other detail should be invented as needed, within reason.
2. The exercise can be done in two variants: whole-class or pair work:
   a. Whole-class variant: the teacher chooses a pair of students who act out the scene in front of the class.
   b. Pair work variant: the class is divided into pairs acting out the scene. If time allows, the roles can be exchanged.
3. The teacher monitors the groups and offers help.

In this stage, the students will be involved in an interactive exercise that should draw upon the knowledge acquired throughout the previous activities. Focus should be placed on operationalising this knowledge so as to address a communicative need in a spontaneous fashion. Depending on the classroom situation, the teacher may wish to use the opportunity to highlight the need for objectivity and self-awareness in matters related to culture, i.e., both sides of the exchange should truthfully admit what they know and what they do not know (in other words, not pretending to be an expert based on a 1,5 h class which featured Chinese architecture).

Materials

- Material 18: Worksheet – *Architecture and Tourism*

2.1.3 Student Materials Architecture

Material 1: Worksheet – *Architecture vs. Buildings*

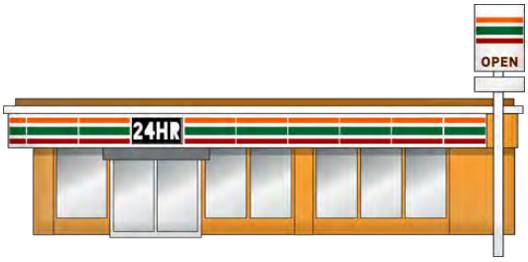


Figure 1

Figure 2

Exercise 1

Look at the pictures and discuss in pairs:

Which picture shows a building? Which picture shows a work of architecture? Can both pictures represent both? Discuss.

Exercise 2

Look at the pictures and discuss in pairs:

Which caption goes with which picture?

a. meaning conveyed by architectural signs	b. meaning conveyed by conventional signs

Material 2: Worksheet – *Le Corbusier*

Exercise 1

Discuss the questions in pairs / small groups.

a. If you had the possibility, would you like to work as an architect? Why / why not?

b. What do you think are the main pros and cons of working as an architect?

Exercise 2

Read the quote – discuss it in pairs.

> "It is life that is right and the architect who is wrong."
>
> —— Le Corbusier* (toward the end of his life)

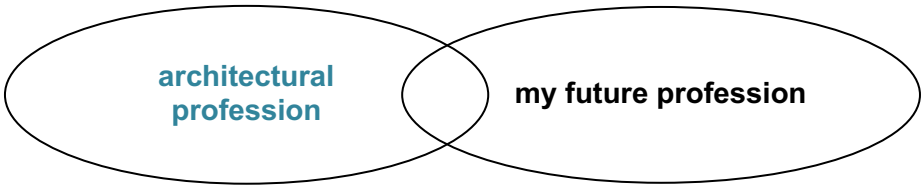
* Le Corbusier [1887–1965] was a famous Swiss-French architect and one of the pioneers of modern architecture.

Material 3: Worksheet – *Architects vs. Other Professions*

Exercise 1

Work in pairs. Think about the architectural profession, your future profession and what they have in common, and then fill out the diagram accordingly. Choose from the qualities below (you don't need to choose them all!). Once you are ready, compare your answers in pairs.

- ✓ understand mathematical principles
- ✓ be creative
- ✓ have good design skills
- ✓ know yourself
- ✓ have good communication skills
- ✓ have the ability to work in a team
- ✓ have good artistic skills
- ✓ be good at problem-solving
- ✓ have the ability to work under time pressure
- ✓ be flexible
- ✓ be business-minded
- ✓ be technically oriented



Material 4: Worksheet – *Ethics in Architecture*

Exercise 1

All the expressions below are taken from a video you are about to watch. Match the beginnings with the endings so that they form correct collocations (try to use each ending once only):

to provide	*a. interests*
to practise	*b. requirements*
sufficient	*c. income*
conflicting	*d. short on your goals*
to serve	*e. of cold water*
to offer a welcome splash	*f. a profession*
competing	*g. shelter*
to step	*h. the public*
to come up	*i. back*
to walk	*j. the walk*

Exercise 2

Use some of the collocations formed in exercise 1 to complete the sentences below (you may need to change their form). For the time being ignore the […] symbol.

a. There are a lot of *[2 options possible*] _____ inherent in my future profession, such as…

b. I am sure that my future job will guarantee a _____ to provide for my family.

c. The last time I _____ was when… I failed in achieving my objectives because….

d. I often talk big, but I can back it up too! I definitely talk the talk but also _____.

e. The main obligation of every architect is [*2 options possible*] _____.

f. When I encounter problems, it is easy for me _____ and identify my strengths and weaknesses.

Exercise 3

Look again at the statements in exercises 2. If there are any […] gaps in them – compare them with ideas that are true for you. Then talk about the statements in pairs – compare your ideas for a and c and then discuss whether you agree with b, d, e and f.

Exercise 4

Watch the video fragment (00:00:00–00:03:06) in which architects talk about their profession and fill out the table with the right phrases (choose from the expressions below). There are FOUR expressions you do NOT need to use.

educate people

express the desires of culture and society

make the architect known

popularize new technologies

produce art

provide for the architect and their family

provide shelter

server the client

serve the public

upgrade the surroundings

building functions	tension points in architects' careers

Exercise 5

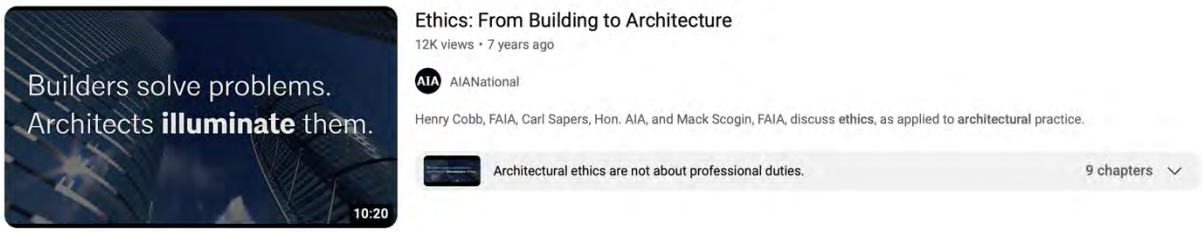
Categorise an architect's obligations in terms of their importance. Watch the video again, if necessary. Please note: one obligation can't be categorised and should always be present – if the building is to become architecture. Which one is it?

the art	the architect's interest	the public interest	the client's interest

Exercise 6

Discuss in pairs: Are you surprised by the hierarchy? Why / why not? Is it – in any way – similar to what you might expect in your future profession? Why / why not?

Material 5: Video – *Ethics*: *From Building to Architecture*



AIANational (2016, February 19). *Ethics: From Building to Architecture* [Video file]. Retrieved from https://www.youtube.com/watch?v=xthJKWOErVU

Material 6: Worksheet – *Additional Reading & Grammar Practice*

Exercise 1

Read an excerpt from a short introduction to the video you watched before. Four sentences have been removed. Choose from the sentences (A–F) the one which fits each gap (1–4). There are two extra sentences which you do not need to use.

⇨ HINT: When doing the task, pay attention to text cues (= what comes before / after in the text).

A. We must step back to understand it better.

B. But then Saper adds a fourth tension point: “devotion to the art of architecture”.

C. Only by experiencing the design – and appreciating how it impacts the world of its owners and users, and the public – can we judge how each architect has met this challenge.

D. For those whose ethical focus is on our very specific professional ethical code, the AIA Code of Ethics and Professional Conduct, Cobb has offered a welcome splash of cold water.

E. This is so because buildings need to provide shelter; and yet at the same time, they are “so inherently a part of expressing the desires, needs and aspirations of culture and society”.

F. Instead, looking beyond the code is likely to raise questions and issues that we might not otherwise encounter.

Examining the Four Obligations Every Architect Will Face

In the video “Ethics: From Building to Architecture,” three architects – Henry Cobb, Carl Sapers, and Mack Scogin – discuss ethics, as applied to architectural practice in the broadest sense. Cobb immediately takes ethics beyond the architect, to the building: “For me, the issue of ethics in architecture is not primarily about practice; it is about what I call 'the voice of architect,' the way that buildings speak.” **(1)**

As they later explain, the world of professional ethics is defined as a series of obligations. Four primary obligations, faced by every architect, are summarised by Sapers near the beginning of the video discussion. The first three, which he defines as “tension points in an architect’s career,” include:

1) sufficient income to support the architect and his or her family;
2) the “sometimes conflicting requirements of serving the client”; and
3) the sometimes preceding and “competing interest of serving the public.”

When there is conflict, Architects must weigh the client’s interest over their own; and the public’s interest over both.

(2) Hanging on an aspirational statement, no architect is likely to be disciplined or sanctioned for coming up short. Yet no architect can be said to have performed successfully without attention to this dimension of practice, which Sapers notes is “in some ways, a peculiar attribute of the architect.”

To grasp the role of the architect in society and to navigate our practice within these "conflict points," architects must be careful not to limit their ethical perspective to a standard professional code. **(3)**

The architect is charged with acting ethically throughout the course of a project, whether interacting with clients, the public, colleagues, or employees. We must look to the final result of the architect's work and passion – the building (or space, or composition) – to understand the ethical tensions posed by each project – and how the architect has "walked the walk." **(4)**

Exercise 2

Look at the underlined fragments in the sentences below (some of them come from exercise 1) and decide to which time they ALL relate – time before NOW or time before NON-PAST / FUTURE.

a. Yet no architect has performed successfully without attention to this dimension of practice.

b. We must look to the final result to understand how the architect has "walked the walk".

c. Only by experiencing the design, can we judge how each architect has met this challenge.

d. It is a general rule that students who have not enrolled are not admitted to the course.

Exercise 3

Choose the best verb and article form from the ones in brackets, so that the quotes are well-formed and make sense in the context. Then decide, what is the time reference for each quote – the time before NOW, the time before NON-PAST / FUTURE or the time before PAST. Choose each reference once only.

a. A design teacher to a first-year architecture student: 'As a rule, (a / the) building is not architecture unless it (has provided / had provided) shelter for someone.'

b. An architect on holiday, upon seeing a dilapidated, vacant apartment block: '(A / The) building is not architecture as it (has not provided / had not provided) shelter for anyone.'

c. An architecture historian during their lecture stated: 'Le Corbusier was a pioneer of modern architecture, even if his practice (has partly disillusioned / had partly disillusioned) him.'

Material 7: Worksheet – *Megadorm*

Exercise 1

All the expressions below come from a short text you are about to read. Match the beginnings with the endings so that they form correct collocations (try to use each ending once only):

1. student	*a. viral*
2. to go	*b. use of space*
3. cutting	*c. trade-offs*
4. to maximise	*d. edge*
5. common	*e. down*
6. review	*f. dormitory*
7. to back	*g. committee*
8. a game of	*h. in stone*
9. set	*i. areas*

Exercise 2

The article excerpt below describes a difficult situation that the University of California has recently found itself in. Read the text to find out what the situation is, and why it is difficult. Compare your answers in pairs, and then report back to class.

Figure 1: A rendition of Munger Hall at University of California, Santa Barbara. Photograph: Courtesy UC Santa Barbara

Since last Thursday, when an architect's resignation letter went viral the internet has been widely commenting on the construction plan for a student dormitory at the University of California, Santa Barbara.

The billionaire who is funding the project, **Charlie Munger**, believes it will be a cutting-edge student residence that will maximize use of space. He also argues that small bedrooms will encourage residents to spend time together in common areas.

Munger is a self-taught architecture enthusiast. He donated $ 200m to the University of California campus on the unusual condition that the university use a housing plan that he had designed himself.

The dorm, named Munger Hall (see *Figure 1*), will house 4,500 students in a building with two entrances, and 94 percent of the rooms will have no windows. Instead of windows, the rooms will have glowing screens that mimic sunlight. The dormitory's nine identical residential floors (see *Figure 2*) will be organized into eight "houses" with eight "suites" with eight bedrooms each.

Dennis McFadden, who had been a member of the university's design review committee for 15 years, resigned in protest, calling the dormitory an unprecedented "social and psychological experiment" on students "unsupportable" from his "perspective as an architect, a parent, and a human being."

Yet Munger does not agree: "Everybody loves light, and everybody prefers natural light. But it's a game of trade-offs. If you build a big square building, everything is conveniently near to everybody in the building. If you maximize the light, you get fewer people in the building."

Nothing is set in stone, but so far the university is not backing down. "We are delighted to be moving forward with this transformational project, which directly addresses the campus's needs," the university administration stated. Indeed, for a university with more than 26,000 students and a great need for more accommodation, Munger's donation may seem like **a blessing**…

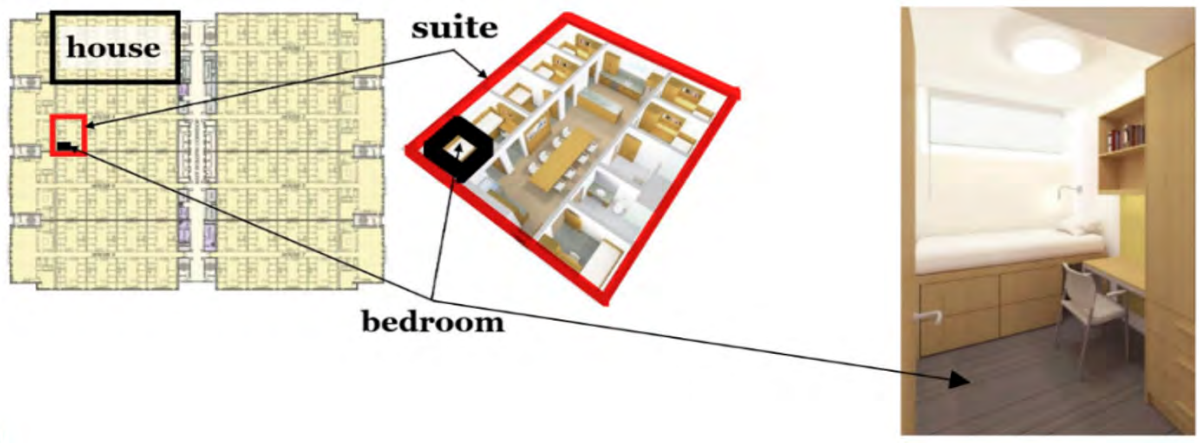


Figure 2: Adapted from Courtesy (n.d.). *Typical Residential Floor* [Rendering]. Santa Barbara Independent. https://www.independent.com/2021/10/28/architect-resigns-in-protest-over-ucsb-mega-dorm/

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Exercise 3

Recall what you learned earlier about architecture and decide in pairs.

a. Is Munger Hall a building or a work of architecture? Why?

b. Who is the architect here? Who is the client? Who is the user / the public?

c. Whose interests are favoured here? The architect's? The client's? The user's / the public's?

Material 8: Worksheet – *Discussion Phrases*

Exercise 1

Look at the list of phrases and decide which of them describe problems (P), explain solutions (S) and inquirie (I). Write the relevant letter (P), (S) or (I) next to each phrase.

a. A critical element of the solution to this problem is…

b. Am I correct in assuming that…

c. Another way of looking at this problem is…

d. Could you expand a little bit on what you said about…

e. I know I have solved the problem because…

f. If I have understood you correctly, your point is that…

g. In order to solve this problem, we must first / initially…

h. One way to visualise this problem is…

i. Sorry, but I'm not quite clear on…

j. The most important thing to remember in this problem is…

k. The solution to this problem will require…

l. We know our solution is correct because…

Exercise 2

Look at the six lists of discussion phrases (**A**–**F**). Match each list with the function it serves.

Affirming ____

Disagreeing ____

Expressing an opinion ____

Holding the floor ____

Offering a suggestion ____

Reporting a groups's idea ____

A	**C**	**E**
We decided/agreed that… We concluded that… Our group sees it differently. We had a different approach.	Maybe we could… What if we… Here's something we might try.	I think/believe that… In my opinion… Based on my experience, I think…
B	**D**	**F**
I don't agree with you because… I got a different answer than you. I see it another way.	That's an interesting idea. I hadn't thought of that. I see what you mean.	As I was saying, … If I could finish my thought… What I was trying to say was…

Material 9: Worksheet – *Discussion Phrases & Role Cards for Discussion*

Exercise 1

Look at the lists of discussion phrases. Highlight the phrases that are new to you. Make sure you use five of these phrases in the discussion that follows.

describing problems	**explaining a solution**	**inquiring**
• A way of thinking about solving this problem is… • Another way of looking at this problem is… • In order to solve this problem, we must first/initially… • Let's break this down into parts. • First, ... • One way to visualise this problem is… • The most important thing to remember in this problem is… • This problem is similar to… • We need to identify…	• A critical element of the solution to this problem is… • We know our solution is correct because… • A diagram or symbol that might represent this solution is… • The solution to this problem is… • The solution to this problem will require…. • I know I have solved the problem because…	• Could you expand a little bit on what you said about… • How does … work? • I didn't understand what you talked about … • I wonder why … • I'd like to ask you about … • I'm sorry, could you repeat what you said about … • If I have understood you correctly, your point is that … • Something else I'd like to know is … • Sorry, but I'm not quite clear on … • Could you be more specific about … • Am I correct in assuming that …

reporting a group's idea	offering a suggestion	expressing an opinion
• We decided/agreed that… • We concluded that… • Our group sees it differently. • We had a different approach.	• Maybe we could… • What if we… • Here's something we might try.	• I think/believe that… • In my opinion… • Based on my experience, I think…

disagreeing	affirming	holding the floor
• I don't agree with you because… • I got a different answer than you. • I see it another way.	• That's an interesting idea. • I hadn't thought of that. • I see what you mean.	• As I was saying, … • If I could finish my thought… • What I was trying to say was…

Exercise 2

Work in groups of four. There is a problem that you need to discuss and decide together on the best action to take. In your discussion(s) draw as much as possible on the content and language that you have learned today. Your roles are coming… ☺

✂----------

Role cards

You are **Dennis McFadden**. Although you had recently resigned from the University of California Design Review Committee, they invited you to discuss the Munger Hall dormitory again so as to help them decide on the best action to take.

You accepted the invitation, as you are willing to help – as long as the other parties are ready to cooperate.

You are **Charlie Munger**. You were invited by the University of California Design Review Committee to discuss your dormitory proposal.

You accepted the invitation, as you are willing to cooperate and make some concessions (you are *not* an architect, after all…) – as long as other parties use well-reasoned arguments.

You are **Head of the University of California Design Review Committee**. You have invited Charlie Munger, Dennis McFadden and Head of the University Student Association to discuss the future of the Munger Hall investment. You will lead the discussion, and, later, present its final outcome to us.

Your main objective is to reach a sensible compromise that will be acceptable to all the parties.

You are **Head of the University of California Student Association**. You were invited by the University Design Review Committee to discuss the Munger Hall dormitory proposal and help them decide on the best action to take.

You accepted the invitation, as you believe that students having as say is vital. And they may help everyone reach a reasonable compromise.

Material 10: Worksheet – *The Significance of our Architectural Environment*

Please share your opinions in pairs on whether you believe the quote from Louis Kahn to be universally acceptable or limited to a particular context. You may want to refer to the background of Louis Kahn below.

> *"Even a brick wants to be something."*
>
> —— Louis Kahn

Louis Kahn was an Estonian-born American architect. He created a style that was monumental and monolithic; his heavy buildings for the most part do not hide their weight, their materials, or the way they are assembled.

Below is a picture of a building designed by Louis Kahn (Salk Institute in San Diego, California completed in 1965).

A few words on the design and function of the building above:

The laboratories of the Salk Institute, first conceived as a pair of towers separated by a garden, evolved into two elongated blocks mirroring each other across a paved plaza. The central court is lined by a series of detached towers whose diagonal protrusions allow for windows facing westward onto the ocean. These towers are connected to the rectangular laboratory blocks by way of small bridges, providing passage across the rifts of the two sunken courts, which allow natural light to flood the research spaces below. Kahn included these courts not only as light wells, but as references to the cloisters of the monastery of St. Francis of Assisi – an example for which Salk had previously expressed his admiration.

For further information see: Fiederer, L. (2017, August 27). AD Classics: Salk Institute. *Archdaily*. www.archdaily.com/61288/ad-classics-salk-institute-louis-kahn

Additional pictures (if necessary)

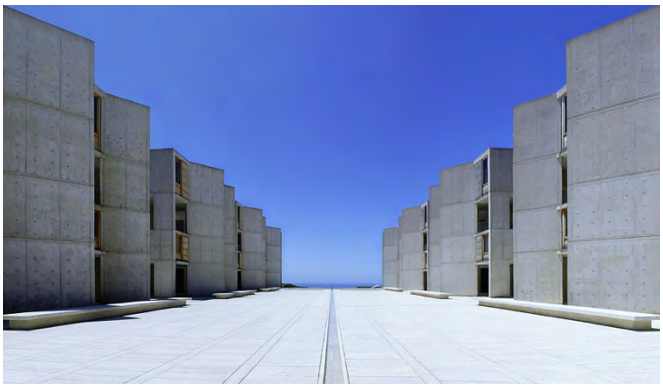

Figure 1

Figure 2

Figure 3

Figure 4

Figure 1–4: Fiederer, L. (2017, August 27). *Salk Institute* [Photographs]. Archdaily. https://www.archdaily.com/61288/ad-classics-salk-institute-louis-kahn

Material 11: Worksheet – *Useful Vocabulary to Describe Buildings*

Look at the list below and check if you know the meaning of the words. Look them up in a dictionary, if needed. Then put the words in the right column of the table.

materials	building types	functions
brick funerary glass imperial metal palace palatial	pottery religious residential secular shack skyscraper soil	stone temple tenement house terraced house tower vernacular wood

Material 12: Worksheet – *Pictures Presenting Various Types of Buildings*

Please categorise the pictures in different ways, using any criteria that seem relevant / interesting to you.

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Further Information

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Figure 2: Wenn, G. (2007, Feburary 7). *Fenghuang County 000059* [Photograph]. Wikipedia commons. https://commons.wikimedia.org/wiki/File:Fenghuang_County_000059_-_panoramio.jpg

Figure 3 : Garcia, P. (2015, May 3). *Yuyuan Garden, Shanghai* [Photograph]. Wikipedia commons. https://commons.wikimedia.org/wiki/File:Yuyuan_Garden_-_panoramio.jpg

Figure 4: Nicolussi, R. (2010, December 12). *Hakka Village, Fujian* [Photograph]. Wikipedia commons. https://commons.wikimedia.org/wiki/File:Hakka_village_-_panoramio.jpg

Figure 5: Yip, C. (2017, July 19). *Structure Hui, Anhui* [Photograph]. Wikipedia commons. https://commons.wikimedia.org/wiki/File:Structure_Hui_(220374877).jpeg

Figure 6: llee_wu. (2013, September 6). *Three Natural-born Bridges* [Photograph]. Flickr. https://www.flickr.com/photos/13523064@N03/9694506806

Figure 7: Kallgan. (2006, June 9). *Shenwumen Gate (神武门) of Forbidden City, Beijing* [Photograph]. Wikipedia commons. https://commons.wikimedia.org/wiki/File:Forbidden_City_Beijing_Shenwumen_Gate.JPG

Figure 8: Liuxingy. (2018, April 6). *Yaodong, Shanxi* [Photograph]. Wikipedia commons. https://commons.wikimedia.org/wiki/File:梁家河红色教育_09.jpg

Material 13: Worksheet – *Types of Chinese Traditional Architecture*

Please read the text about different types of Chinese architecture below and fill in the table.

architectural type	**geographic region**	**materials used**	**usage**	**feature**
siheyuan				
tulou				
yaodong				

Three Main Types of Chinese Architecture

31 January 2017,
by Isabella Baranyk

Part I

Vernacular architecture refers to designs which find their primary influence in local conditions: in climate, in materials, and in tradition. In a country as diverse as China, with 55 state-recognized ethnic minority groups and widely varying climates and topographies, many different vernacular dwelling styles have evolved as pragmatic solutions that accommodate the unique needs and limitations of their sites. Rapid urbanisation in China has favoured high-rise apartment towers over traditional housing; because of their ease of construction and the number of residents they can house, making vernacular dwellings increasingly rare throughout the country. Some firms, like MVRDV and Ben Wood's Studio Shanghai, have taken note of the many benefits that vernacular dwellings provide, and have created designs that attempt to reconcile tradition with urbanisation. Even if you aren't planning on building in China any time soon, the following housing styles have much to teach us about what it means to live in a particular time and place. This is by no means an exhaustive list, but it does encompass the main types of vernacular dwellings seen throughout China.

Part II

Siheyuan

A prominent part of Beijing's culture, *siheyuan* are made up of four rectangular buildings arranged in a square to create an inner courtyard. They are set up for multi-generational living, with the rooms furthest from the street historically reserved for the family's daughters, who were once expected to remain inside the compound's walls. The main building housed the head of the household, leaving servants in the smaller side quarters. The buildings' overhanging roofs provide a shaded courtyard, which has a similar purpose to that of a living room, and acts as a private outdoor space for the family. Rows of *siheyuan* create alleys, called hutongs, that connect the city. Today, Beijing's *siheyuan* are often occupied by multiple families and are notorious for lacking amenities. Since the typical siheyuan is no more than two stories tall, the pressure of population density has made apartment blocks far more favoured among developers and city planners; although some projects have attempted to create a sense of newness while maintaining the design principles of siheyuan-hutong.

Part III

Tulou

The Southeastern province of Fujian is home to the *tulou* residences of the Hakka people. Compounded earth and wooden beams form thick, cylindrical walls that reach several stories high in a once-necessary effort to protect the interior from attack. The outward facing walls have only one entrance and no windows, and all balconies, doorways, and openings face inwards, further protecting the residents from potential danger. Each structure houses hundreds of people – an entire clan – and functions as a small village, with space for communal activities in the large, open interior. Unlike the hierarchical structure of the *siheyuan*, individual residences within the *tulou* were divided equally: a reflection of how highly the notion of community was regarded by the designers of the *tulou*, something that can also be observed in the building's egalitarian round shape. In 2008, 46 *tulous* were designated as UNESCO World Heritage Sites because of their peaceful and unifying combination of defensive and residential architecture, and will be protected should their neighbourhoods in rural Fujian ever become urbanised.

Part V

Yaodong

Found in China's northern provinces, including (perhaps most famously) Shaanxi, the *yaodong*, or cave houses, use earth from the hillside as insulation to regulate temperature in harsh winters and extreme summers. They can be carved into a hillside, dug into the ground to create a sunken dwelling, or built standalone by packing earth on top of a brick frame. Multiple dwellings are built adjacent to and on top of one another and together make up a tiered village, often for a single clan or extended family. As more young people have moved into big cities in search of work, *yaodong* living has become less popular. However, the last decade has seen a newfound appreciation for the economic and environmental benefits of *yaodong* living, and NGOs have found some success in building and marketing new dwellings as green and efficient housing options.

Baranyk, I. (2017, January 31). 4 Chinese Vernacular Dwellings You Should Know about (Before They Disappear). *Archdaily*. Retrieved February 3, 2023, from https://www.archdaily.com/804034/4-chinese-vernacular-dwellings-you-should-know-about-before-they-disappear

Material 14: Worksheet – *Exercises to the Text on Chinese Traditional Architecture*

Task A

Read the following sentences.
Find the sentence in the text which conveys similar meaning?

1. When Chinese cities were quickly developing, high blocks of flats were preferred because they could accommodate a greater number of inhabitants each.
2. The items do not form a complete listing.
3. They are constructed in such a way that children, parents and grandparents can live in the same complex.
4. It shows that social relations were highly valued; this can also be seen in the round design, stressing the equality of all members.
5. In the last ten years, yaodong architecture was rediscovered because of its advantages in terms of its cost and impact on the surroundings.

Task B

In each of the sentences below, decide which option matches the information from the text.

1. The authorities of China recognize / are recognized by 55 ethnic minority groups.
2. The city connects / is connected by hutongs.
3. City planners prefer siheyuan to apartment blocks / apartment blocks to siheyuan.
4. Like / Unlike siheyuan, tulou is divided in an egalitarian fashion.
5. The decrease of yaodong architecture popularity drives / is driven by young people's migration to the cities.
6. Vernacular architecture often influences / is influenced by the environment.

Material 15: Worksheet – *"A Theory of Culture" by Patrick Moran*

Read the information:

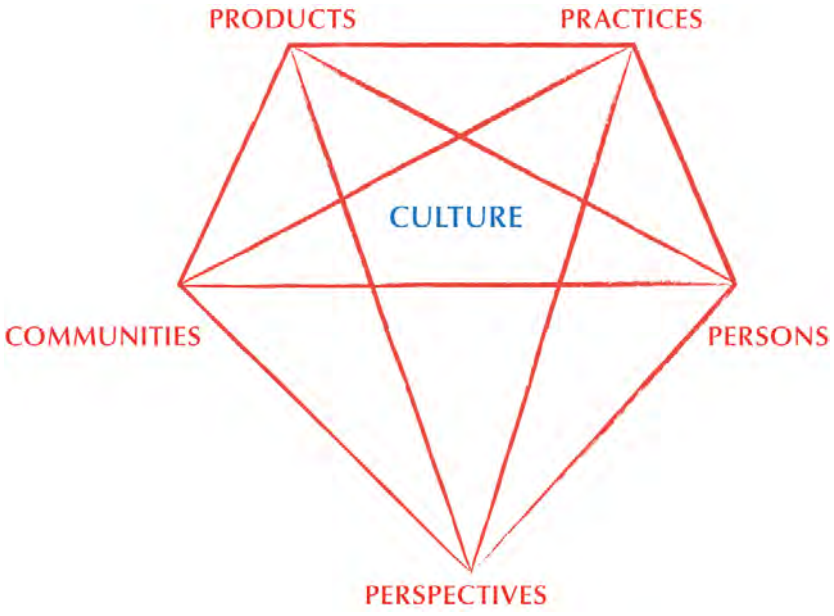
Culture can be analysed via its components

- products
- practices
- persons
- individuals
- and perspectives.

The authors of this concept chose the form of a diamond to illustrate the relations between these 5 components.

Discuss:

Why do you think they have chosen this shape? What are the implications of such a depiction of the relationships between the elements of culture?



Moran, P. R. (2006). *Teaching Culture: Perspectives in Practice*. Heinle & Heinle, p. 24.

Material 16: Worksheet – *Practical Application of Patrick Moran's Diamond Diagram of Culture*

Try to think what elements of culture played an important role in the creation of the types of architecture discussed before (Material 13: Worksheet – *Types of Chinese Traditional Architecture*). Choose the type of traditional buildings and fill in the table according to the example of siheyuan architecture:

Example: Siheyuan architecture (based on Material 13: Worksheet – *Types of Chinese Traditional Architecture*)

products	**practices**	**perspectives**	**persons**	**communities**
siheyuan-style building complex	Many generations of a family living close together.	Family should be there for each other. Family businesses should be protected from external attention. The elders and men are privileged in the family.	Members of the family of different generations, sex, and hierarchical position.	Inhabitants of the city (being composed of hutongs).

Tulou architecture

products	practices	perspectives	persons	communities

Yaodong architecture

products	practices	perspectives	persons	communities

Material 17: Worksheet – *Polish Traditional Architecture in the Kurpie Region*

Try to think what elements of culture played an important role in the creation of a traditional Kurpie cottage described in the following passage:

Chałupa Kurpiowska

The traditional architecture forms of the Kurpie region are inseparably linked with nature that boasts the open landscape of the Kurpie region. These forms serve as symbols of cultural distinctiveness of the region and its local identity. Building a house was a ritual. During the construction of the cottage, the owner organised "zakładziny" [commencement of the construction], to which he invited foremen with workers and neighbours. On hewn logs and beams, refreshments with beer were provided. Once the building was finished by carpenters, "wianek" [wreath-hanging] was arranged – a bunch of green branches were hooked on the top. Once the house was completed, it was consecrated by a local priest. After the blessing, usually a feast and dances on the new floor were organised.

Follow the example of a Shiheyuan architecture given in the table below.

Example: siheyuan architecture (based on Material 13: Worksheet – *Types of Chinese Traditional Architecture*)

products	**practices**	**perspectives**	**persons**	**communities**
siheyuan-style building complex	Many generations of a family living close together.	Family should be there for each other. Family businesses should be protected from external attention. The elders and men are privileged in the family.	Members of the family of different generations, sex, and hierarchical position.	Inhabitants of the city (being composed of hutongs).

Polish architecture in the Kurpie region

products	practices	perspectives	persons	communities

Adapted from Starzyk, A. (2021). The Kurpie Region. Transformation of Settlement Landscape until Poland's Accession to the European Union. In *Mazowsze Studia Regionalne*, Special Edition 2021, pp. 31–48.

Material 18: Worksheet – *Architecture and Tourism*

Student A: You have been to China on a professional, architecture field trip, where you got to know the traditional architecture types and styles. Whereas your friend (Student B) is arranging a trip to China for recreational purposes and will try to learn what he should see, when he gets there, based on their preferences.

Help organise Student B's trip according to two features chosen from the list below.

Draw two cards with character traits of your friend.

likes the hustle and bustle of a big city	likes learning about traditions	likes to spend time close to nature
seeks inspiration for modern architectural projects	wants to enjoy as many foreign experiences as possible	wants to explore alternative lifestyles
seeks inspiration for new business	enjoys socialising with local people	prefers using well prepared and organised tourist infrastructure (e.g., guides, transport)

2.1.4 Appendix

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2.2 Arts and Media

Unit 1 – Job Interviews

Unit 2 – Public Speaking

This module has two units. Unit 1 has a focus on the job interviews process (media monitoring specialist) and Unit 2 deals with analysing and perfecting one's public speaking skills in order to leave a great first impression.

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2.2.1 Introduction

What Is This Module About?

This module focuses on the field of Arts and Media. It has two units: Unit 1 looks at the job interview process from the perspective of a media monitoring specialist; and Unit 2 deals with identifying and analysing important aspects of public speaking.

In Unit 1, students will learn to identify main stages in a job interview process. Students will also work with basic statistics and pointers required for an international job interview; and ask and answer common job interview questions. Students will get a better understanding of the way different professional cultures function and communicate while dealing with different professional cultures. Students will learn to formulate and answer job interview questions and they will give feedback about the interview process itself. Unit 1 can be successfully used in different ESP classes by adjusting the job advertisement according to the students' academic area. The unit practices the language of communication, with a focus on interaction in realistic situations.

In Unit 2, students should determine the various facets of public speaking and acquire field-specific vocabulary (e.g., pitch, volume, etc.). Furthermore, they will have a better understanding of how public speaking should be conducted. What is more, students will be expected to identify cultural differences that may affect public speaking, such as traditions and cultural acceptability. The topics may be changed to meet learning needs and course requirements. Finally, learners should be able to study speeches in terms of various public speaking tools, reflect on them in writing and have their peers provide feedback on these analyses. Completing the unit should help students master certain skills related to public speaking, to include the ability to assess other students' texts.

Module Structure and Implementation

Unit 1 can be taught on-site or online, and it consists of five different stages. The unit starts with a job interview quiz as a warm-up activity. The aim of this activity is to lead to the job interview process by having students make educated guesses about job interviews in an international context. Stage two of the unit is to introduce the problem. Students discuss ideas related to the job market, content-related vocabulary is expanded and recalled, and students read an article that prepares candidates for an actual job interview. In stage three (analysing the problem) students read a genuine job advertisement in the field of media and come up with job interview questions. Stage four is about solving the problem; students have the opportunity to practice being both interviewers and interviewees. In the last stage, students reflect on the job interview process, recalling and presenting information. Speaking, listening and reading skills are developed.

Unit 2 can also be taught both on-site and online and consists of four different stages. However, as the unit mostly focuses on developing communicative skills, students would benefit from a face-to-face on-site setting. Completing the whole unit should take approximately 90 minutes, with some time allocated for self-study. The unit starts with a warm-up discussion which reviews common ways of interpreting public speaking and identifying related cultural factors. Throughout stage 1, students practice free speaking. Stage 2 introduces various aspects and

tools of public speaking, based on a video input. Students acquire field-specific terminology and identify aspects that may affect public speaking in cross-cultural settings. Stage 3 of the unit refers to analysing various aspects of two authentic speeches. The purpose is to implement the previously acquired terminology regarding public speaking and identify differences between two speakers and their attitudes. Stage 4 reviews the entire unit, focusing on correlations between attitudes and practice. Conversation and writing are practiced.

Both units are language-sensitive as language is needed in order to comprehend and analyse various aspects of job interviews and public speaking. The units are interactive and performative in that students are expected to interact in order to comment on employment procedures and reflect on effective public speeches.

Language Levels and Scaffolding Options

The units are suited for B2 / C1 language levels. The exercises collectively support the honing of general English skills and the gleaning of field-specific knowledge.

2.2.2 Teaching Guidelines Art and Media

Unit 1: Teaching Guidelines

Topic: job interviews

Level: B2

Skills: speaking, listening, reading

Timing: ~ 90 min. of study

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. can identify main stages and interview questions in a job interview process. ✓ Ss. can identify main statistics, form and answer job interview questions. ✓ Ss. can successfully use language related to job interviews and evaluate job interview related concepts.	✓ Ss. have a better understanding of the way different professional cultures function. ✓ Ss. can meet their communicative needs when dealing with different professional.	✓ Ss. can formulate and answer job interview questions. ✓ Ss. can give feedback about the job interview process.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. warm-up	~ 10 min	pair work / group work
2. introducing the problem	~ 25 min	classroom discussion / pair work / individual work
3. analysing the problem	~ 20 min	individual work / group work
4. solving the problem	~ 30 min	pair work / group work
5. summing up	~ 5 min	classroom discussion

Materials

- Material 1: Quiz – *Job Interviews*
- Material 2: Discussion – *The Job Market*
- Material 3: Vocabulary Activity – *Job Interviews*
- Material 4: Worksheet – *Preparing for a Job Interview*
- Material 5: Handout – *A Job Advertisement*
- Material 6: Worksheet – *Preparing Job Interview Questions*
- Material 7: Worksheet – *Reflections*

STAGE 1 – WARM-UP

Objectives

content objectives	language objectives	culture objectives
✓ to lead-in to job interviews topic ✓ to personalise the content	✓ to recall content-related vocabulary	✓ to identify international job interview statistics

Suggested Procedure

1. The teacher hands out Material 1 to each pair / group and asks them to discuss the quiz questions.
2. The teacher monitors the discussion.
3. Students share their answers and opinions with the whole class, guided by the teacher, who writes useful phrases on the board.
4. The teacher corrects the answers if necessary and gives background information. The teacher and students give feedback.

The aim of the activity is to prove a lead-in to job interviews with a short quiz (working in pairs / small groups). It is fine for students to guess, if they are not sure of the answers. After the students have had some time to discuss related issues arising from the quiz, the teacher encourages students to share their responses. The teacher provides the required background information.

Teacher's Notes

1. You only have 7 seconds to make a good first impression. Everybody knows how important first impressions are; so, smile, shake hands, look smart, speak clearly, and be as genuine as you can be.
2. 85 % of people lie on their resumes: just one of the many job interview facts. Most people who lie on their resumes do so just because they don't have enough work experience or don't have the required skills for the job. However, you have to understand that interviewers are trained to recognize discrepancies. They usually do this by asking in-depth questions about previous work experience, doing background checks, and even contacting former employers to verify CV information.
3. Nearly 91 % of employers have stated that they prefer candidates to have had some work experience.
4. Unprofessional and inappropriate email addresses are the most common reason for job candidates being rejected. Then again, just as an email should be professional, so should the CV. Actually, a whopping 43 % of CVs are discarded for having been poorly written.
5. 47 % of the candidates fail their job interview because they didn't have enough information about the company they applied to. Job interview statistics show that nearly 50 % of the applicants failed the interview because of a lack of knowledge about the company and the job they wanted. It's highly recommended to do some research about the company and the position that is being applied for.

Materials

- Material 1: Quiz – *Job Interviews*

Answers

Material 1: Quiz – *Job Interview*s

1. b – 7 seconds
2. a – 85%
3. a – 91%
4. c – 76%
5. c – 47%

STAGE 2 – INTRODUCING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to prepare students for an actual job interview	✓ to discuss ideas related to job interviews ✓ to expand / recall content-related vocabulary ✓ to read and understand a text (preparation for the actual job interview)	✓ to identify international job interview questions and context

Suggested Procedure

1. The teacher hands out Material 2 and asks students to discuss in pairs / small groups. Students will share their ideas.
2. The teacher monitors the progress and writes useful phrases on the board.
3. The teacher hands out material 3 to each pair and asks students to discuss the meaning of the words related to job interviews. The teacher asks students to choose four to complete the quotes.
4. Students share their answers with the whole class. The teacher monitors the discussion and writes useful phrases on the board; and shares background information if necessary.
5. The teacher hands out Material 4. Students will read the article and do the true and false exercise.
6. The teacher and students give feedback.

Material 3: Vocabulary Activity – *Job Interviews*: The aim of this activity is to expand / recall content-related vocabulary in a different context and prepare students for the reading exercise.

Material 4: Worksheet – *Preparing for A Job Interview*: The aim of this activity is to prepare students for the actual job interview, and to prep them for some common question types. There are three types of questions: common interview questions, competency questions and hypothetical questions. Students will also get an overview of the STAR technique (**S**ituation, **T**ask, **A**ction, **R**esult). Understanding of the text is checked by the True and False task.

Materials

- Material 2: Discussion – *The Job Market*
- Material 3: Vocabulary Activity – *Job Interviews*
- Material 4: Worksheet – *Preparing for a Job Interview*

Answers

Material 3: Vocabulary Activity – *Job Interviews*

1. going off-topic – not on the main topic, irrelevant to the discussion

competency – the ability to do something well

nerve-racking – making you feel very nervous and worried. *It was a nerve-racking drive up the mountain.*

encounter – to experience something, especially something unpleasant or difficult, when trying to do something else

to recall – bring (a fact, event, or situation) back into one's mind; remember.

redundant – (of a person) without a job because there is no more work available for you in a company. *To be made redundant.*

2. a) redundant
b) nerve-racking
c) encounter
d) to recall

Material 4: Worksheet – *Preparing for a Job Interview*

1. true
2. true
3. false
4. true
5. true
6. false
7. false
8. true

STAGE 3 – ANALYSING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to read an actual job advertisement in the field of media	✓ to form job interview questions ✓ to practice vocabulary related to a job interview / advertisement	✓ to be ready for a job interview in an international setting

Suggested Procedure

1. The teacher hands out Materials 5 and 6 and divides students into two groups (A and B).
2. In groups A and B, students will read the job advertisement and prepare the job interview questions.
3. The teacher will monitor the group work and help with some useful questions types if necessary.
4. The teacher and students share feedback.

Materials

- Material 5: Text – *A Job Advertisement*
- Material 6: Worksheet – *Preparing Job Interview Questions*

STAGE 4 – SOLVING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to practice being interviewer and interviewee	✓ to practice asking and answering the questions	✓ to participate in a job interview in an international context

Suggested Procedure

1. The teacher asks students to work in pairs. Students are asked to find an interview partner. Students use notes from the previous tasks.
2. Firstly, students from group A are the interviewers and students from group B are the interviewees.
3. Secondly, students from group B are the interviewers and students from group A are the interviewees.

4. The teacher and students share feedback.

The aim of this activity is to give students a chance to be an interviewer and interviewee based on an actual job advertisement. Students are working in pairs (group A and group B) and interview each other based on the interview questions formulated during the previous stage of the teaching unit.

STAGE 5 – SUMMING UP

Objectives

content objectives	language objectives	culture objectives
✓ to reflect on the job interview process	✓ to recall and present information from the job interview	✓ to reflect on the job interview process in an international context

Suggested Procedure

1. The teacher hands out Material 7 and asks students to recall and present information about their interview partner.
2. Students share their ideas.
3. The teacher monitors the presentations and writes useful phrases on the board.
4. The teacher asks students to reflect on the job interview process.
5. The teacher and students share feedback.

Material 7: Worksheet – *Reflections*: The aim of this activity is to sum up, recall and present information from the job interview and reflect on the process.

Materials

- Material 7: Worksheet – *Reflections*

Unit 2: Teaching Guidelines

Topic: public speaking

Level: B2-C1

Skills: listening, speaking, reading, writing

Timing: ~ 90 minutes (plus possible extension / variation activities)

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. are able to determine the various facets concerning public speaking. ✓ Ss. acquire field-specific terminology and practice free speaking.	✓ Ss. will have a better understanding of public speaking and the most beneficial tools. ✓ Ss. can identify cultural and cross-cultural aspects regarding public speaking.	✓ Ss. are able to analyse speeches through various tools of public speaking and produce an article. ✓ Ss. are able to provide feedback.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. warm-up	~ 10–15 mins	pair work / group work / class work
2. introducing the topic	~ 45 mins	individual work in the classroom / pair work / group work / classroom discussion
3. analysing the topic	~ 25–30 mins	individual work in the classroom / pair work / group work / classroom discussion
4. production / summing up	~ 5–7 mins	individual work / independent work / peer evaluation

Materials

- Material 8: Worksheet – *How to Speak So That People Want to Listen*
- Material 9: Video – *How to Speak So That People Want to Listen*
- Material 10: Worksheet – *Venn Diagram Trump vs. Thunberg*
- Material 11: Handout – *Linking Words and Phrases*
- Material 12: Worksheet – *Linking Words*
- Material 13: Checklist – *Academic Writing*

STAGE 1 – WARM–UP

Objectives

content objectives	language objectives	culture objectives
✓ to determine already existing interpretations and understandings of public speaking	✓ to practice free speaking	✓ to identify cultural differences regarding public speaking

Suggested Procedure

1. The teacher asks the students to work in pairs or small groups to determine what makes a convincing and well-given presentation regarding various factors (e.g., visual aids, body language, etc.) and share their ideas. In an international setting, it is possible to identify cultural differences as well (e.g., mannerisms, clothing, etc.).

2. The teacher monitors the pairs, helping with content and / or language, and noting down appropriate and / or problematic language use.
3. Students share their ideas and opinions with the whole group. The teacher writes key ideas or useful phrases on the board, eliciting correct phrases based on the notes taken while monitoring the students.

Extension / Variation

1. In addition to the warm-up activity, the teacher can also show a video (https://www.adelaide.edu.au/english-for-uni/oral-presentation-skills) from 1:14 until 7:42 which highlights errors often made when presenting. The students then note down their main findings and share their ideas with the whole group.
2. The teacher could introduce additional and / or guiding questions before watching the video:
   a. What should be avoided during a presentation?
   b. What could be improved on?
   c. Comment on the use of equipment.

Teacher's Notes

The purpose of the warm-up stage is to introduce the topic and determine the pre-existing understandings and ideas regarding public speaking. The teacher should stress that there are no correct or straightforward answers; however, students should be invited to discuss various aspects of presentation (culture, venue, clothing, etc.) among pairs and later with the whole class.

STAGE 2 – INTRODUCING THE TOPIC

Objectives

content objectives	language objectives	culture objectives
✓ to pinpoint aspects and tools of public speaking, so that people would actually listen	✓ to acquire field-specific terminology and practise free speaking	✓ to identify aspects of public speaking that may or may not work cross-culturally

Suggested Procedure

1. The teacher asks the students to watch a video (Material 9) on public speaking and answer the questions provided on a worksheet (Material 8).
2. Once the students have answered the questions, they are expected to discuss them in pairs or groups.

3. The students are invited to share their thoughts with the whole class.

Teacher's Notes

The purpose of the introductory stage is to provide the students with ideas on public speaking from a professional point of view. The teacher should give the students some time to read through the questions and point out the fact that some of the answers are derived from the video and others are based on students' own opinions.

Materials

- Material 8: Worksheet – *How to Speak So That People Want to Listen*
- Material 9: Video – *How to Speak So That People Want to Listen*

Answers

Material 8: Worksheet – *How to Speak So That People Want to Listen*

1. The seven 'deadly' sins are gossip, judging, negativity, complaining, exaggeration, lying and dogmatism.
2. The four cornerstones of speaking are honesty, authenticity, integrity, and love.
3. (students' opinion)
4. (students' opinion)
5. The tools of public speaking are register, timbre, prosody, pace, pitch, and volume + (students' opinion).
6. According to the speaker, that would be a world that does sound beautiful, and one where understanding would be the norm, and that is an idea worth spreading + (students' opinion).
7. (students' opinion)

Material 9: Video – *How to Speak So That People Want to Listen*

Transcript:

The human voice: It's the instrument we all play. It's the most powerful sound in the world, probably. It's the only one that can start a war or say, "I love you." And yet many people have the experience that when they speak, people don't listen to them. And why is that? How can we speak powerfully enough so as bring about change in the world?

There are a number of habits that we need to move away from. I've assembled for your pleasure the seven deadly sins of speaking. I'm not pretending this is an exhaustive list, but these seven, I think, are the habits that we can all fall into.

First, gossip. Speaking ill of somebody who's not present. Not a nice habit, and we know perfectly well that the person gossiping, five minutes later, will be gossiping about us.

Second, judging. We know people who are like this in conversation, and it's very hard to listen to somebody if you know that you're being judged and found wanting at the same time.

Third, negativity. Everyone can fall into this. My mother, in the last years of her life, became very negative, and was hard to listen to her. I remember one day, I said to her, "It's October 1 today," and she said, "I know, isn't it dreadful?"

It's hard to listen when somebody's that negative.

And another form of negativity is… complaining. Well, this is the national art of the U.K. It's our national sport. We complain about the weather, about sport, about politics, about everything, but actually, complaining is viral misery. It's not spreading sunshine and lightness in the world.

Excuses.

We've all met this guy. Maybe we've all been this guy. Some people have a blame thrower. They just pass it on to everybody else and don't take responsibility for their actions; and again, it's hard to listen to somebody who is being like that.

The penultimate, the sixth of the seven: embroidery, or rather… exaggeration. It often demeans our language. For example, if I see something that really is awesome, what do I call it?

And then, of course, this exaggeration becomes lying, and we don't want to listen to people we know are lying to us.

And finally, dogmatism. The confusion of facts with opinions. When those two things get conflated, you're listening into the wind. You know, somebody is bombarding you with their opinions as if they were true. It's difficult to listen to that.

So here they are, seven deadly sins of speaking. These are things I think we need to avoid. But is there a positive way to think about this? Yes, there is. I'd like to suggest that there are four really powerful cornerstones, foundations, that we can stand on if we want our speech to be powerful and to make change in the world. Fortunately, these things spell a word. The word is "hail," and it has a great definition as well. I'm not talking about the stuff that falls from the sky and hits you on the head. I'm talking about this definition, to greet or acclaim enthusiastically, which is how I think our words will be received if we stand on these four things.

So, what do they stand for? See if you can guess. The H, honesty, of course, being true in what you say…being straight and clear. The A is authenticity, just being yourself. A friend of mine described it as standing in your own truth, which I think is a lovely way of putting it. The I is integrity, being your word, actually doing what you say, and being somebody whom people can trust. And the L is love. I don't mean romantic love, but I do mean wishing people well, for two reasons. First of all, I think absolute honesty may not be what we want. I mean, my goodness, you look ugly this morning. Perhaps that's not necessary. Tempered with love, of course, honesty is a great thing. But also, if you're really wishing somebody well, it's very hard to judge them at the same time. I'm not even sure you can do those two things simultaneously. So, hail.

Also, now that's what you say, and it's like the old song, it is what you say, it's also the way that you say it. You have an amazing toolbox. This instrument is incredible, and yet this is a toolbox that very few people have ever opened. I'd like to have a little rummage in there with

you now and just pull a few tools out that you might like to take away and play with; which will increase the power of your speaking.

Register, for example. Now, falsetto register may not be very useful most of the time, but there's a register in between. I'm not going to get very technical about this for any of you who are voice coaches. You can locate your voice, however. So, if I talk up here in my nose, you can hear the difference. If I go down here in my throat, which is where most of us speak from most of the time. But if you want weight, you need to go down here to the chest. You hear the difference? We vote for politicians with lower voices, it's true, because we associate depth with power and with authority. That's register.

Then we have timbre. It's the way your voice feels. Again, the research shows that we prefer voices which are rich, smooth, warm, like hot chocolate. Well, if that's not you, that's not the end of the world, because you can train. Go and get a voice coach. And there are amazing things you can do with breathing, with posture, and with exercises to improve the timbre of your voice.

Then prosody. I love prosody. This is the sing-song, the meta-language that we use in order to impart meaning. It's root one for meaning in conversation. People who speak all on one note are really quite hard to listen to if they don't have any prosody at all. That's where the word "monotonic" comes from, or monotonous, monotone. Also, we have repetitive prosody, where every sentence ends as if it were a question when it's actually not a question, it's a statement?

And if you repeat that one, it's actually restricting your ability to communicate through prosody, which I think is a shame, so let's try and break that habit.

Pace.

I can get very excited by saying something really quickly, or I can slow right down to emphasize, and at the end of that, of course, is our old friend silence. There's nothing wrong with a bit of silence in a talk, is there? We don't have to fill it with ums and ahhs. It can be very powerful.

Of course, pitch accompanies with pace when it comes to indicating arousal, but you can do it just with pitch. Where did you leave my keys? (Higher pitch) Where did you leave my keys? So, slightly different meaning in those two deliveries.

And finally, volume. (Loud) I can get really excited by using volume. Sorry if I startled someone. Or, I can have you really pay attention by getting very quiet. Some people broadcast the whole time. Try not to do that. That's called sodcasting,

Imposing your sound on people around you carelessly and inconsiderately. Not nice.

Of course, where this comes into play most of all is when you've got something really important to do. It might be standing on a stage like this and giving a talk to people. It might be proposing marriage, asking for a raise, or indeed a wedding speech. Whatever it is, if it's really important, you owe it to yourself to look at this toolbox and the engine that it's going to work on, and no engine works well without being warmed up. Warm up your voice.

Actually, let me show you how to do that. Would you all like to stand up for a moment? I'm going to show you the six vocal warm-up exercises that I do before every talk. Any time you're going to talk to anybody important, do these. First, arms up, deep breath in, and sigh out, ahhhhh, like that. One more time. Ahhhh, very good. Now we're going to warm up our lips, and

we're going to go Ba, Ba, Ba, Ba, Ba, Ba, Ba, Ba. Very good. And now, brrrrrrrrrr, just like when you were a kid. Brrrr. Now your lips should be coming alive. We're going to do the tongue next with an exaggerated la, la, la, la, la, la, la, la, la. Beautiful. You're getting really good at this. And then, roll an R. Rrrrrrr. That's like champagne for the tongue. Finally, and if I can only do one, the pros call this the siren. It's really good. It starts with "we" and goes to "aw." The "we" is high, the "aw" is low. So you go, weeeaawww, weeeaawww.

Fantastic. Give yourselves a round of applause. Take a seat, thank you.

Next time you speak, do those in advance.

Now let me just put this in context to close. This is a serious point here. This is where we are now, right? We are not speaking very well to people, who simply aren't listening in an environment that's all about noise and bad acoustics. I have talked about this on this stage in different phases. What would the world be like if we were speaking powerfully to people who were listening consciously in environments which were actually fit for purpose? Or to expand on this thought: what would the world be like if we were creating and consuming sound consciously and designing all our environments for sound? That would be a world that does sound beautiful, and one where understanding would be the norm, and that is an idea worth spreading.

Thank you.

STAGE 3 – ANALYSING THE TOPIC

Objectives

content objectives	language objectives	culture objectives
✓ to analyse the aspects of public speeches based on two authentic speeches	✓ to implement field-specific terminology and practice free speaking	✓ to identify differences between two speakers and their attitudes

Suggested Procedure

1. The teacher asks the students to watch two videos on public speaking and fill out a Venn diagram (Material 10). The teacher is expected to introduce the principle of a Venn diagram if needed.
2. Once the students have completed the diagram, they are expected to discuss them in pairs or groups.
3. The students are invited to share their thoughts with the whole class.

Extension / Variation

The teacher could introduce linking devices of comparison, contrast, similarity, etc. (however, nevertheless, in spite of, while, similarly, in the same way, etc.) (Material 11) and complete practical tasks (Material 12) to practice linking devices through example sentences.

Teacher's Notes

The purpose of the analysing stage is to find connections between the theory presented in the first speech by Julian Treasure and two authentic speeches by a politician and an activist. The main goal is to implement the knowledge gathered and use it in order to find similarities and differences between the two speeches.

Materials

- Material 10: Worksheet – *Venn Diagram Trump vs. Thunberg*
- Material 11: Handout – *Linking Words and Phrases*
- Material 12: Worksheet – *Linking Words*

Answers

Material 12: Worksheet – *Linking Words*

1. despite
2. according to
3. nonetheless
4. furthermore
5. as a matter of fact
6. to my mind
7. on the other hand
8. except
9. for instance
10. to a certain degree

STAGE 4 – PRODUCTION / SUMMING UP

Objectives

content objectives	language objectives	culture objectives
✓ to find correlations between a document and the attitudes	✓ to implement field-specific terminology and practice writing skills	✓ to identify differences between a document and attitudes and behaviour

Suggested Procedure

1. The students read the overview of The Paris Agreement (https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement) and explore how Sweden and the US have adhered to the agreement (based on various newspaper and / or academic articles, websites, etc.).
2. Students write an article (400–600 words, Times New Roman, size 12, spacing 1.5) based on their findings in order to practice academic writing.

Teacher's Notes

The purpose of this stage is to practice writing skills based on the information and guidelines acquired in previous activities. After the activity, the students are expected to evaluate a fellow student's article.

Extension / Variation

The teacher is expected to provide a checklist for academic writing (*topic sentence, evidence, conclusion, formal language*, etc.) (Material 13) and possibly introduce the main principles of peer evaluation (constructive, specific, thorough, balanced, respectful, etc.).

Materials

- Material 13: Checklist – *Academic Writing*

2.2.3 Student Materials Art and Media

Material 1: Quiz – *Job Interviews*

1. You only have … to make a good first impression.
   a) 20 seconds
   b) 7 seconds
   c) 30 seconds

2. … of people lie on their resumes.
   a) 85 %
   b) 10 %
   c) 50 %

3. Nearly … of employers have stated that they would prefer if their candidate had some work experience.
   a) 91 %
   b) 65 %
   c) 25 %

4. … of resume rejections are due to unprofessional email addresses.
   a) 20 %
   b) 43 %
   c) 76 %

5. … of the candidates failed the job interview because they didn't have enough information about the company they applied to.
   a) 10 %
   b) 80 %
   c) 47 %

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Lazic, M. (2022, November 1). 30 Mind-blowing Interview Statistics to Get You Going in 2022. *Legaljobs*. Retrieved February 18, 2023 from https://legaljobs.io/blog/interview-statistics/

Material 2: Discussion – *The Job Market*

Compare ideas in pairs / small groups.

1. What are some of the worst jobs you can think of? What makes them so bad?

2. What are some of the best jobs you can think of? What made them so memorable?

3. What would be the most satisfying job for you? Give reasons.

4. Do you think our job determines who we are? Explain your answer.

5. How difficult is it to get a job in your country?

6. What is the best way to find a job?

7. How many jobs have you had? The interviews to get those jobs – what were they like?

8. Do you have any tips for doing good job interviews?

Reference List

Kelly, C., & Kelly, L. (n.d.). Conversation Questions. Jobs & Occupation. *The Internet TESL Journal.* Retrieved February 18, 2023, from http://iteslj.org/questions/jobs.html

Material 3: Vocabulary Activity – *Job Interviews*

1. Check if you know the meaning of these words related to job interviews.

going off-topic – competency – nerve-racking – encounter – to recall – redundant

2. Choose four to complete the quotes below.
   a) I was made … from a job as a Purchasing Agent in a shirt-making company in 1996. I was devastated. I had been there for three years, and it was a job I really liked.
   b) Filming costs so much money that it's a very … process, whereas being in a studio is quite cheap, and you have more time to work on things until you feel good about them.
   c) A person learns through experience, and the spiritual path is full of different kinds of experiences. He will … many difficulties and obstacles, and they are the very experiences he needs to complete the cleansing process.
   d) One of the best ways of making yourself happy in the present is … happy times from the past. Photos are a great memory-prompt, and because we tend to take photos of happy occasions, they weigh our memories to the good.

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Xplore (n.d.). Inspirational Quotes at Brainyquote. *BrainyQuote*. Retrieved February 24, 2023, from https://www.brainyquote.com/

Material 4: Worksheet – *Preparing for a Job Interview*

Preparation is the key to a successful job interview. Here's how to practice answering some common question types. Read the article and then do the true/false exercise.

Job Interviews

Job interviews can be a nerve-racking experience, especially when you don't feel prepared for them. And with the variety of interview questions that can be asked these days, it's hard to know what type of questions you should prepare for. Here are three types of interview questions that you should practice answering before that important job interview.

1. Common interview questions

Tell us about yourself.

What are your strengths and weaknesses?

Why do you want to leave your current job?

These questions are for the interviewer to get to know you and to see if you're the best person for the job. Don't simply list things like your hobbies, your strengths or your work experience. Instead, give examples and use them to show your personality and the characteristics you have that make you perfect for the job. Your interviewer may want to ask questions about certain areas of your CV, so use this opportunity to link your experience to the job you're applying for.

Avoid: Giving a detailed life history or telling long stories that are irrelevant to the job or to the company.

2. Competency questions

Tell me about a time you had to work in a team.

Tell me about a time you had to use your creativity to solve a problem.

Tell me about a time when you experienced conflict with a colleague and explain how you handled that situation.

Here, the candidate is asked questions about situations they have faced in the past that can demonstrate a particular skill they have. These could include skills like critical thinking, influencing, problem solving or flexibility. Interviewers often want to hear about challenges you've had, not just about times when everything went smoothly, so be ready with examples such as how you resolved a conflict in your team or dealt with someone who was not working well. This will demonstrate that you can handle difficult situations.

When preparing for the job interview, read the job description carefully for the required skills and abilities and try to recall situations where you had to use these skills. Then use the STAR technique to talk about these examples:

- **S**ituation – Give details about the context of your example and what you were trying to do.
- **T**ask – Describe your responsibilities and the challenges you faced.
- **A**ction – Describe what steps you took to deal with the situation.
- **R**esult – Talk about the end result and how you contributed to this outcome.

Avoid: Going in unprepared and having to think up examples, or saying you've never faced any challenges at work.

3. Hypothetical questions

What would you do if you had a different opinion from your boss about how to do something?

How would you deal with a large volume of work with several staff members off work?

What would you do if you had to introduce a new policy that you knew was going to be unpopular in your team?

Hypothetical interview questions are similar to competency questions except that instead of asking you to talk about an experience you've had in the past, they present you with an imaginary situation that you might face in your new job.

This might seem difficult to prepare for, but remember that your answers are meant to demonstrate the skills needed for the job. When preparing for the interview, consider the qualities that the interviewer might be looking for, qualities like conflict management, time management or people skills. Then think about how you can demonstrate those qualities in a range of situations. Start with situations that you've experienced and move on to other possible situations that you might encounter in the role you're applying for.

Avoid: Going off-topic, changing the subject and not answering the original question.

Whatever type of questions they ask, interviewers want to find the right person and are keen to give you the opportunity to demonstrate what you can do. With some preparation, you can show them that you're the perfect fit for the job.

British Council (n.d.). Job Interviews. *Learn English*. Retrieved February 18, 2023, from https://learnenglish.britishcouncil.org/business-english/business-magazine/job-interviews

According to the text, are the sentences true or false?

1. The main message in this article is that you should spend time preparing for a job interview if you have one coming up. **True / False**
2. If the interviewer asks you about yourself, you should make sure all the information you give is relevant to the job. **True / False**
3. You should avoid talking about personal things like your hobbies. **True / False**
4. If the interviewer asks you about an item on your CV, you can give more detail and say how it is connected to the job you're applying for. **True / False**
5. The STAR technique can be used to organise your story when answering competency questions. **True / False**
6. You should never talk about difficulties you've experienced at work. **True / False**
7. You can't prepare for hypothetical interview questions. **True / False**
8. It helps to think about the skills and qualities that the interviewer is looking for when answering interview questions. **True / False**

Reference List

British Council (n.d.). Job Interviews. *Learn English*. Retrieved February 18, 2023, from https://learnenglish.britishcouncil.org/business-english/business-magazine/job-interviews

Material 5: Text – *A Job Advertisement*

Job Description Are you on the lookout for new adventures, and do you dream of working in one of Europe's finest capitals? Do you possess top-rate communication skills in at least one the Nordic languages, as well as English? Then you could be the right person to join our Nordic team in Tallinn. 	**Your tasks** As a Media Monitoring Specialist in Tallinn, you will be working with media monitoring and media analysis, and you will be supporting some of the biggest companies and organisations in the Nordic region. You will join a Nordic team, so communication and collaboration with international colleagues will be a natural part of your day. Your tasks will be tailored to match your skills and interests as much as possible, but you can envisage yourself working on a combination of tasks that could include: ● Precise and efficient selection of news content for specific customers ● Analysis of media content based on customer-specific parameters ● High-quality written summaries of news articles and broadcast segments ● Management of media data
Requirements We would like to hear from you if… You are enthusiastic about delivering quality products for our customers, and you are able to understand customer needs and translate them into value-adding products and insights. You will have a wide range of contacts, so collaboration must be second nature to you, but you are also driven by a desire to perform individually. Furthermore, we would like you to have: ● Knowledge about media and how they operate ● Top-rate communicative skills – you master one or more of the Nordic languages as well as English ● A knack for learning new systems, and a desire to become an expert in our technological universe	**Company offers** Your future colleagues are local Estonians as well as expats and newcomers from Denmark, Norway, Sweden, and Finland. Everyone will support you and help you get settled quickly. We will provide: ● Private health care insurance. Estonia also offers free health care services for everyone who pays taxes in the country. ● Financial support for sports activities.

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Material 6: Worksheet – *Preparing Job Interview Questions*

Prepare questions for a job interview. Remember to use polite, formal language. Interviewer A	Prepare questions for a job interview. Remember to use polite, formal language. Interviewer B
1. Experienced conflict?	1. Working as a team member?
2. Strengths and weaknesses?	2. Motivation?
3. Present job?	3. Present job?
4. Current salary?	4. Reason for wanting this job?
5. Last job?	5. Your main strength?
6. Describe your personality?	6. Ideal salary?
7. Knowledge of this company?	7. Colleagues' opinion of you?
8. Intercultural competence?	8. Intercultural competence?
9. Your own question (job advertisement)	9. Your own question (job advertisement)
10. Your own question (job advertisement)	10. Your own question (job advertisement)
11. Your own question (job advertisement)	11. Your own question (job advertisement)

Reference List

Haines, S. (2022). *Learning to Teach the Language of Communication*. Delta Publishing.

Material 7: Worksheet – *Reflections*

Please answer these questions about your interview partner.

1. How would you describe your interview partner?

2. What are the strengths of your interview partner?

3. What motivates your interview partner?

4. How would a colleague describe your interview partner?

5. Describe a challenging situation your interview partner has faced?

6. What are the intercultural competences of your interview partner?

Reference List

British Council (n.d.). Job Interviews. *Learn English*. Retrieved February 18, 2023, from https://learnenglish.britishcouncil.org/business-english/business-magazine/job-interviews

Material 8: Worksheet – *How to Speak So That People Want to Listen*

How to Speak so That People Want to Listen

Before watching Julian Treasure's speech "How to Speak so That People Want to Listen", guess what could be considered the 'deadly' sins of speaking.

YOU ARE ABOUT TO WATCH THE VIDEO. ANSWER THE FOLLOWING QUESTIONS WHILE WATCHING:

1. Name the so-called 7 'deadly' sins of speaking and comment on them (add your own examples).

2. Name the 4 cornerstones of speaking which are mentioned by the author.

3. 'Standing in your own truth' – how do you understand this phrase? Bring an example.

4. How do you interpret the saying that 'absolute honesty may not be what we want'?

5. Make a list of top 3 most useful/most influential tools in your opinion and elaborate.

6. What would the world be like if we were creating sound consciously, consuming sound consciously and designing all our environments consciously for sound? Add your own thoughts.

7. Mention one idea/concept/thought which you found interesting/extremely dull/fascinating, etc. What have you learnt by watching this video or what would you like to practice?

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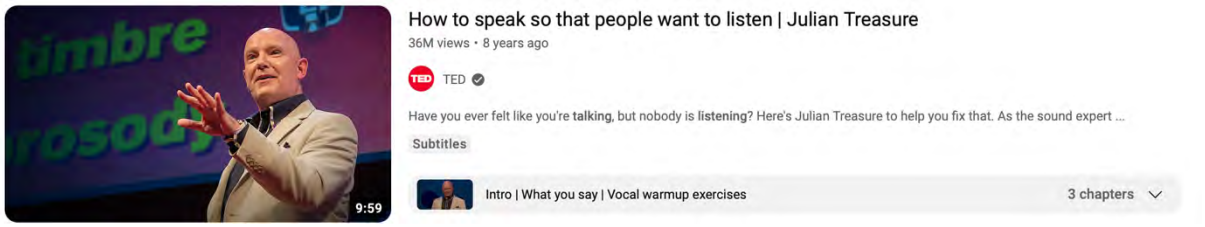
Material 9: Video – *How to Speak So That People Want to Listen*



TED (2014, June 27). *How to Speak So That People Want to Listen* [Video file]. Retrieved from https://www.youtube.com/watch?v=eIho2S0ZahI

Material 10: Worksheet – *Venn Diagram Trump vs. Thunberg*

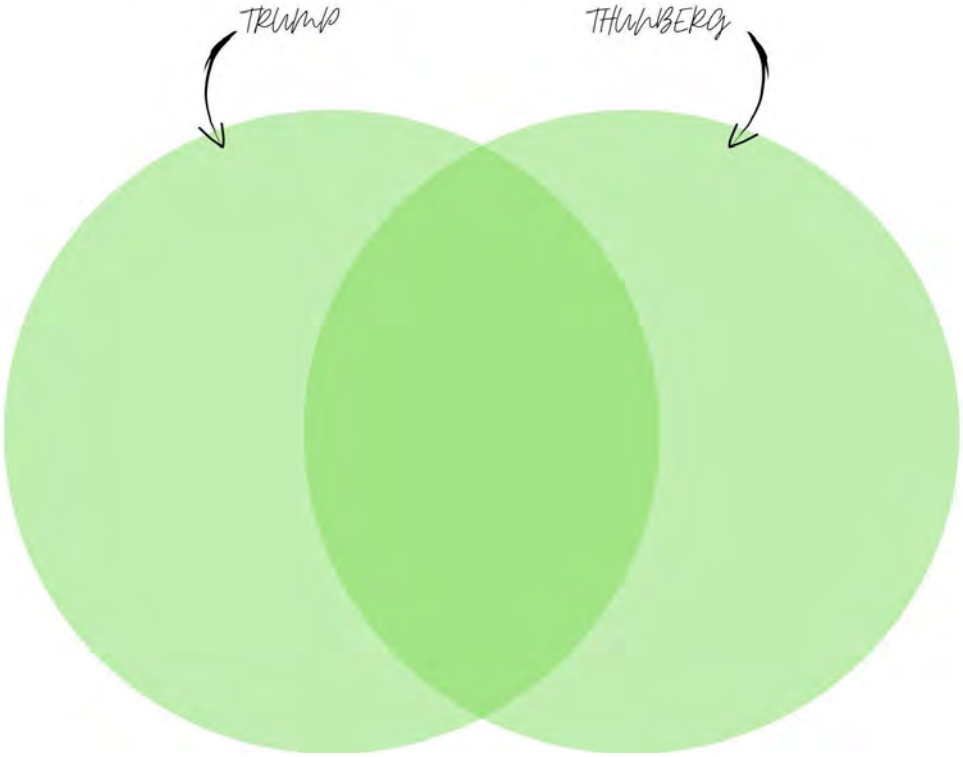
Watch the two videos.

Now This Earth (2020, December 3). *Greta Thunberg Calls for Hope 5 years after the Paris Agreement* [Video file]. Retrieved from https://www.youtube.com/watch?v=A_jUNzE28zc

BBC News (2017, July 1). *Trump Pulls US out of Paris Climate Deal* [Video file]. Retrieved https://www.youtube.com/watch?v=jP55meWILt4

Complete the diagram with similarities and differences, analyse various aspects of the speech and the speaker. Consider the following:

- content (facts)
- four cornerstones of speaking (honesty, authenticity, integrity, and love)
- the toolbox of speaking (volume, pitch, pace, register, timbre, and prosody



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Material 11: Handout – *Linking Words and Phrases*

Personal opinion:	In my opinion / In my view / To my mind / To my way of thinking / I am convinced that / It is my firm belief that / I am inclined to believe that / It seems to me that / As far as I am concerned / I think that our efforts will meet with success.
To list advantages and disadvantages:	One advantage of / Another advantage of / One other advantage of / A further advantage of / The main advantage of / The greatest advantage of / The first advantage of having a pet is that they are fantastic company. One disadvantage of / Another disadvantage of / One other disadvantage of / A further disadvantage of / The main disadvantage of / The greatest disadvantage of / The first disadvantage of having a pet is that they need a lot of care.
To list points:	Firstly / First of all / In the first place / Secondly / Thirdly / Finally / To start/begin with, we have to make both sides feel comfortable before talks can continue.
To list points in a …:	beginning – First / To start/begin with / First of all, make sure you have all the necessary ingredients. continuing – Secondly / After this/that / Afterwards / Then / Next, mix all the ingredients in a bowl. concluding – Finally / Lastly / Last but not least, bake the cake in a medium oven.
To add more points to the same topic:	What is more / Furthermore / Apart from this/that / In addition (to this) / Moreover / Besides (this) / ... not to mention the fact that the internet has made a major impact on education, which will greatly influence the way we teach and learn. Not only has the internet made a major impact on education, but it will also greatly influence the way we teach and learn. The internet is both having a major impact on education and is something that will influence the way we teach and learn.
To express cause:	The house was demolished because / owing to the fact that / due to the fact that / on the grounds that / since / as they are going to build a block of flats there. In view of / Because of / Owing to the fact that they are going to build a block of flats there, the house was demolished. They are going to build a block of flats there; for this reason, the house was demolished. Seeing that they are going to build a block of flats there, the house was demolished.

To refer to other sources:	With reference to / According to recent statistics, the number of un-employed is increasing.
To express effect:	Her health was failing, and she wanted more time with her family; thus / therefore / so / consequently / as a result / as a consequence / she decided to retire.
To express purpose:	She quit her job, so that she could travel around the world. She quit her job, so as to / in order to travel around the world. I bought a new bicycle with the purpose / intention of cycling to work in the mornings.
To emphasise a point:	Indeed / Naturally / Clearly / Obviously / Of course / Needless to say, the extent of his talent guaranteed that he would be a great actor.
To express reality:	It is a fact that / In effect / In fact / As a matter of fact / The fact of the matter is (that) / Actually / In practice / Indeed, failing to watch your diet will lead to your gaining weight.
To give examples:	For instance / For example, by providing flexible working hours, businesses can encourage employees to be more productive. By providing incentives such as / like flexible working hours, businesses can encourage employees to be more productive. If employees are to be more productive, then the provision of incentives, particularly / in particular / especially flexible working hours, is essential.
To make general statements:	As a (general) rule / By and large / Generally / In general / On the whole, the more decisions you let a child make on his own, the more self-sufficient they will be.
To partially agree:	Up to a point / To a certain extent/degree / To some extent/degree / In a sense / In a way / To a limited extent, this is true but serious athletes will always need the support of their coach and team-mates.
To express limited knowledge:	To the best of my knowledge / As far as I know, Tony has already sent the letters.
To state other people's opinions:	It is popularly believed that / People often claim that / It is often alleged that / Some people argue that / Many argue that / Most people feel that / Some people point out that homeopathic remedies can be more effective than conventional medicine. Contrary to popular belief, conventional medicine is not always as effective as homeopathic remedies.

To make contrasting points:	It is a well-known fact that wearing seat belts saves lives; yet / however / nevertheless / but / even so / still / nonetheless large numbers of drivers refuse to wear them. Although / Even though / Regardless of the fact that / In spite of the fact that / Despite the fact that / While wearing seatbelts is known to save lives, large numbers of drivers refuse to wear them.
To express balance (the other side of the argument):	Opponents of animal testing argue / claim / believe that experiments can be conducted in other ways without losing their efficacy. While it is true to say that the government is investing in retraining schemes, in fact the unemployment rate is still high. The fact that there are still no recycling bins in my area contradicts the belief / idea that the town council care about the environment.
Negative addition:	Neither my sister nor my brother have ever travelled abroad. My sister has never travelled abroad; nor / neither has my brother. My sister has never travelled abroad, and my brother hasn't either.
To express exception:	He has visited every European country apart from / but / except (for) one.
To clarify/ rephrase:	In other words / That is to say / To put it another way, if you treat people with respect they are far more likely to treat you with respect.
To express similarity:	Making a list before you go shopping is important if you want to save money; similarly / likewise / in the same way / buying products that are on sale also helps you stay within your budget.
To give an alternative:	We could (either) go to Malta or Tunisia. We could go to Malta. On the other hand / Alternatively, we could go to Tunisia.
To express condition:	You may use this room on condition that / provided (that) / providing (that) / as long as you keep quiet. You may use this room only if you keep quiet. In the event of an emergency / In the event that / If an emergency arises, call security. In case of emergency, call security Do you happen to know whether Sandra works at home or not? Get your ticket early otherwise / or (else) you might not get in.
To express consequence:	The sun is getting increasingly more dangerous; consequently / as a result, I never go out between midday and three. I'm hoping to get back today; if so, I'll come see you, if not / otherwise, I'll give you a call.

To conclude:	Finally / Lastly / All in all / Taking everything into account/consideration / On the whole / All things considered / In conclusion / On balance / For the above mentioned reasons / To sum up, it is felt that you would not be suitable for the position.
Time:	The green light comes on when / whenever / before / after humidity reaches 90 %. Wait until / till the crust is a golden brown before removing the pie. There has been no news of the child since five o'clock yesterday evening. She spotted them as she was getting on the bus. She saw her while she was waiting for a taxi. I never see her now that she has moved to the city.
Reference:	I am writing to request more information regarding/concerning the position advertised in Sunday's edition of The Times. I am writing with respect/regard/reference to / in regard/reference to the availability of product no. 127492.
Summarising:	In short / Briefly / To put it briefly, I've never met a nicer person!

Material 12: Worksheet – *Linking Words*

Use the following linking devices to complete the sentences. Use each linking device just once.

according – as a matter of fact – despite – except to my mind – for instance – furthermore – nonetheless – on the other hand – to – to a certain degree

1. …… the evidence that paper coffee cups can't be recycled, many people continue to use them.

2. …… many employers, it is necessary to let the company know in good time whether you want to accept the offer once you have been offered the job.

3. There are serious problems in our company. ……, we feel it is the moment to fire the head of sales.

4. The student's speech was cohesive. ……, she had learnt it by heart.

5. Our staff is not reducing. ……, our department is growing and growing.

6. The interviewer asked the applicant some very personal questions, which …… seemed all wrong.

7. My husband thinks that the most important cornerstone of public speaking is authenticity – I, ……, prefer honesty.

8. She rarely judged people, …… when she felt she had been mistreated.

9. In the electronics industry, ……, 5,000 jobs are being lost due to including more machines in the production.

10. The downfall of the enterprise, ……, was unavoidable.

Material 13: Checklist – *Academic Writing*

Academic Writing Checklist

- ☐ An academic writing should be divided into paragraphs.
- ☐ The final sentence of the introduction is a thesis statement (a sentence that expresses the main idea of a paper.
- ☐ Paragraphs should start with a topic sentence (a sentence that introduces a paragraph and connects to a thesis statement).
- ☐ Support the statements with appropriate evidence (data, statistics, examples, etc). Avoid irrelevant information.
- ☐ Make sure that your paper has an introduction, body paragraphs, and a conclusion.
- ☐ Avoid contracted forms (forms that combine a pronoun or noun and a verb, or a verb and not) (e.g. *won't* should be *will not*, *didn't* should be *did not*, etc.)
- ☐ Use formal language (avoid slang and colloquial expressions).
- ☐ Use linking devices in order to make it easy to follow for the reader.
- ☐ There should be no new information in the concluding paragraph. In order to guide the reader, start the paragraph with a concluding phrase (*in conclusion*, *to sum up*, etc).
- ☐ Before submitting your paper, double-check the spelling and whether you have addressed all the aspects of the task.

Created with Canva (https://www.canva.com/)

2.2.4 Appendix

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Figure 1 (upper left): Ivy Exec (n.d.). *Job Interview* [Photograph]. Ivy Exec. https://www.ivyexec.com/career-advice/2021/the-top-40-questions-to-expect-in-a-job-interview-and-how-to-answer/

Figure 2 (middle): TedxRockVille. (n.d.). *Ted* [Photograph]. TedxRockVille https://www.tedxrockville.org/about.html

Figure 3 (upper right): JobsDB (n.d.). *The 5 Best Out-of-office Auto-reply Email Templates You Can Copy and Paste* [Photograph]. JobsDB by Seek. https://hk.jobsdb.com/en-hk/articles/out-of-office/

Figure 4 (lower left): Peter Schreiber Media (2020, October 13). *Top View of a White Desk with Magnifying Glass over the Word Job* [Photograph]. iStock. https://www.istockphoto.com/photo/top-view-of-a-white-desktop-concept-job-search-gm1279104620-377813858?phrase=job%20search

Figure 5 (lower right): uschools/Getty (n.d.). *Woo Your Audience as You Would a Blind Date* [Photograph]. https://www.nature.com/articles/d41586-022-01798-6

2.3 Automotive Engineering

Unit 1 – From the Preindustrial Walking City to the Automobile City

Unit 2 – Autonomous Vehicles: Present and Future

The module Automotive Engineering is structured in two units. Unit 1 deals with the evolution of urban settings from the preindustrial walking city to the automobile city, whilst Unit 2 deals with the connection between smart cities and autonomous vehicles. The students can develop their language skills in the domain and other competences such as critical thinking and social communication / interaction.

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2.3.1 Introduction

What Is This Module About?

This module has the overall aim of improving students' skills (reading, listening, speaking, writing) and language knowledge, while familiarising them with the field of automotive engineering. Structurally, the module is organised into two units: Unit 1 is focused on the evolution of cities from the preindustrial walking city to the automobile city, whilst Unit 2 deals with the connection between smart cities and autonomous vehicles. Therefore, the two units follow a coherent line that starts from what the city used to be like when walking was the primary mobility tool and the technological progress enjoyed by cities following the introduction of (autonomous) cars.

Students will be encouraged to engage actively with the study materials, with the final aim of acquiring more knowledge in the field and communicating this knowledge in an efficient way.

The module has been designed to meet the premises of the TE-Con3 model: Therefore, it is culture-oriented, glocal as well as performative and interactive. For instance, the glocal character relies on the presence of both global and local concerns and matters that are culture-oriented. The latter dimension is tightly related to the other features, especially performativity and interactivity. Over the course of several activities, the students are asked and encouraged to express their opinions and to engage in a role-play that helps them to articulate those opinions which are, nevertheless, rooted in the mentality / culture of the community the students belong to.

In conclusion, this module provides learners with the possibility of acquiring further knowledge on the urban setting and the impact cars have upon the same. This choice of topic comes as a direct relation to the STEAM paradigm (European Committee of the Regions, 2019) that the TE-Con3 model actively reflects as an asset in the European labour market and a factor promoting not only employability, but also active European citizenship.

Module Structure and Implementation

Both units in the Automotive Engineering module follow the same structure. Unit 1 has five stages. It starts with a warm-up, i.e., a discussion about the evolution of cities, and continues with setting the scene (a discussion on the impact of vehicles in cities), analysing the problem (formulating questions / suggestions related to possible solutions), applying the knowledge (essay writing and / or debate about the impact of cars on cities in the past and in the future), and summing up (key-words related to city traffic).

Unit 2 commences with a warm-up (a dialogue on the space allocated to transportation in cities), and continues with setting the scene (grammar and vocabulary activities related to the issue of congestion), analysing the problem (practising listening and reading via a video about autonomous vehicles as one possible solution to urban congestion, then writing the (counter) arguments presented therein), applying the knowledge (role-play on finding solutions to the issue of congestion in nowadays cities), and summing up (synthesising proposals of solutions and voting for the best option considering the previous stage).

The aim of this module is to make students gain content knowledge, to practise language skills and form opinions about the topic of automotive engineering.

Both units provide the students and teachers with the option of implementing them in two ways: on-site (face-to-face learning, using the hard copies, the PPT presentations and the videos, interacting with others, especially in the role-play activities, when non-verbal communication plays a significant role) or online on the MUL-TECON platform (as self-study materials, with self-paced learning or an auxiliary resource for classroom use).

Language Levels and Scaffolding Options

Both units of this Automotive Engineering module can be implemented for the B2-language level. The teaching / learning process is based on authentic texts and materials.

2.3.2 Teaching Guidelines Automotive Engineering

Unit 1: Teaching Guidelines

Topic: the impact of automobiles in cities

Level: B2

Skills: speaking, listening, reading, writing (integrated)

Timing: ~ 90 min. of study

Planned Learning Outcomes:

	TO KNOW	**TO VALUE**	**TO ACT**
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. can identify main issues related to the field of automotive engineering. ✓ Ss. can use language to acquire, synthesise and evaluate automotive-related concepts.	✓ Ss. acquire a better understanding of other professional cultures (automotive engineers). ✓ Ss. can satisfy their communicative needs when dealing with other professional, national cultures.	✓ Ss. can formulate and present their views on both stages of the evolution of cities. ✓ Ss. can negotiate and reach a compromise by means of negotiation.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. warm-up (discussion about the evolution of cities)	~ 10 min	individual work / pair work / T – Ss. (to initiate and follow up)
2. setting the scene (discussion on vehicle impact on cities)	~ 15 min	pair work / T – Ss. (to initiate and follow up)
3. analysing the problem (formulating questions / suggestions related to possible solutions)	~ 35 min	individual work / pair work / group discussion / T – Ss. (to initiate and follow up)
4. applying the knowledge (essay writing and / or debate)	~ 25 min	individual work / pair work group discussion / T – Ss. (to initiate and follow up)
5. summing up (key-words related to city traffic)	~ 5 min	individual work / T – Ss.

Materials

- Material 1: PPT Presentation – *Stages of the City*
- Material 2: Worksheet – *Two Types of Cities*
- Material 3: Worksheet – *Cars and Cities: A Good Match?*
- Material 4: Worksheet – *The Issue of Pollution*
- Material 5: Worksheet – *Does the Future of the Automotive Industry Belong to Robots?*
- Material 6: Role Cards

STAGE 1 – WARM-UP

Objectives

content objectives	language objectives	culture objectives
✓ to personalise the content related to city life matters ✓ to select appropriate schemata for the content	✓ to develop content-related language ✓ to practice free speaking	✓ to indicate elements of the city setting impacted by automotive technology ✓ to explain opinions about city features in various stages of their evolution

Suggested Procedure

1. When introducing the topic of the class, the teacher lets the students know that – they will need to think about the automobile city as compared to the preindustrial walking one; and then share their ideas. The teacher shows a set of pictures, representing the preindustrial walking city and the automobile city (in the form of Material 1: PPT Presentation – *Stages of the City*), asking students to pay attention to the elements of the setting. The teacher asks the students to express their first impression when comparing the images of the same city in different periods, then the teacher introduces the topic and goals of the unit.
2. Then the students are asked to take note of the various elements of the setting and compare them, referring to the impact of automotive technology upon those elements (streets, parks, buildings…).
3. Students share their answers and opinions with the whole class, the teacher writes the main ideas or some useful phrases related to the topic of the lesson on the board. The teacher elicits correct phrases.
4. The teacher monitors the students performing the activity and helps with content / language if needed.
5. The teacher hands out Material 2: Worksheet – *Two Types of Cities* to each student and asks the students to read and arrange the statements in each column.

Teacher's Notes

This stage aims to introduce the topic of the lesson and to motivate students to get involved in the didactic process. The teacher should encourage students to express their opinions and to freely share their views about the topic of the lesson, the modern / smart city compared to the old walking city. An open dialogue during this stage of the lesson serves as a reference point for a fruitful discussion regarding the impact of automotive technology upon the city during the following stages of the lesson.

After students have studied the pictures representing the preindustrial walking city and the modern city and asked to express their opinions, the teacher should stress that many answers are possible as long as they make a valid argument.

Materials

- Material 1: PPT Presentation – *Stages of the City*
- Material 2: Worksheet – *Two Types of Cities*

Answers

Material 2: Worksheet – *Two Types of Cities*

pre-industrial walking city	automobile city
decreases the use of fossil fuels	leads to traffic congestion
produces less air and noise pollution	requires more infrastructure and produces more waste
encourages walking, biking, and public transit	There is a vast increase in the amount of land devoted to parking.
There is additional land for green space that is not being used by vehicles.	increases the amount of air pollution

STAGE 2 – SETTING THE SCENE

Objectives

content objectives	language objectives	culture objectives
✓ to identify aspects of cities related to automotive technology ✓ to argue on the impact of cars upon cities	✓ to develop / recall content-related lexis ✓ to practice free speaking	✓ to find advantages and disadvantages of cars in cities ✓ to evaluate city life aspects from a cultural point of view

Suggested Procedure

The teacher asks the students to discuss how cars changed the quality of life of city populations / dwellers based on the answers the students formulated during the previous activity.

1. The teacher asks the students to form two groups.
2. Students in both groups are given the following domains: streets, green zones, buildings, health, economics with respect to jobs and incomes.
3. The teacher asks the students to think about the impact of cars and automobile technology upon the cities, referring to each one of these domains (Material 3: Worksheet – *Cars and Cities: A Good Match?).*
4. One group of students is asked to formulate as many advantages as they can, the other group is asked to formulate disadvantages regarding the development of the car industry and the increased use of cars.
5. Students work in groups and they collaborate to develop their ideas and to formulate reasons for their opinions. In each group, the results of the discussions are written down on a flip chart.

6. The teacher monitors students and asks them to pay attention to the content and the spelling of the structures written on the flip chart by each group.
7. When the students have completed the task, a representative of each group communicates the result of their work. Then, they might add some ideas about the role of cars in their personal lives.

Teacher's Notes

The aim of this stage is to engage students in a more detailed analysis of the elements of the city that are impacted by automotive engineering. The topic proposed for discussion is meant to make students identify those aspects of modern cities which are affected by the use of cars, as well as to classify and compare the impact of cars on the quality of life in cities nowadays.

The teacher should invite students to share their opinions freely, as there is no single correct answer.

Materials

- Material 3: Worksheet – *Cars and Cities: A Good Match?*

Answers

Material 3: Worksheet – *Cars and Cities: A Good Match?*

domains					
	streets	green zones	buildings	health	economy (with respect to jobs and incomes)
advantages	construction of new roads as a means of extending infrastructure; easier mobility on the street due to personal cars; independ-ence from crowded public transport	maintenance of the green areas with the help of special vehicles; collecting waste from the green area with the help of special vehicles	regular layout of buildings on each side of the road	healthcare facilities are more accessible (both for home care and hospitals); highly equipped medical intervention vehicles	jobs = higher revenues; economic growth (operational development; greater availability of products (logistics); faster transport of a product from one place to another

disadvantages	traffic jams; higher rate of accidents; crowded streets	decrease in green spaces in order to make way for road construction	parking spots for building inhabitants – disadvantage in terms of physical space and costs; underground parking – not always safe	vehicular smoke and its effects on the human body, as well as on the environ-ment; lack of physical exercise	increased costs of car maintenance; unpredictable expenses; increased fuel consumption with older-generation cars

STAGE 3 – ANALYSING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to identify aspects of cities related to automotive technology ✓ to argue the impact of cars on cities	✓ to develop / recall content-related lexis ✓ to practise free speaking ✓ to formulate open-ended questions, suggestions	✓ to find advantages and disadvantages of cars in cities ✓ to evaluate city life from a cultural point of view

Suggested Procedure

1. Students are encouraged to discuss freely in groups about the results of the previous activity formulating open-ended questions about the opinions and the arguments presented by the other group, such as: Why…? What for…?
2. Final open-ended questions suggested by the teacher: How could the disadvantages identified be turned into "more positive" options? What actions could and should be taken to reduce the negative impact of cars on people's lives, especially in densely populated cities? What are possible solutions to this current issue? These questions and others the teacher may think of will serve as a basis for an open discussion about ways in which the challenges of the automobile city could be addressed today and in the future.
3. One of the disadvantages previously discussed: pollution, will be further examined as a means of understanding its impact on the city and with the aim of finding possible solutions to it.
4. The teacher gives each student a worksheet (Material 4: Worksheet – *The Issue of Pollution*) and asks them to work individually to accomplish the tasks.

Teacher's Notes

This stage of the lesson comprises two activities which are designed with a view to developing students' language skills by way of a content-driven and multidisciplinary teaching process.

The specific objective of the first activity is to make students find arguments for and against the increasing use of cars in modern cities. The aspects of the relation between life quality of the inhabitants, environmental issues and use of cars are analysed by the students, then discussed in groups, to help students to develop a proactive attitude to social challenges.

The second activity aims to make students more aware of the environmental changes determined by automotive engineering and the intensive use of cars. The domain-specific content will lead students to acquiring better understanding of the effects of car emissions, and will elicit and develop genre-specific vocabulary.

Materials

- Material 4: Worksheet – *The Issue of Pollution*

Answers

Material 4: Worksheet – *The Issue of Pollution*

A. 1. F

2.T

3.T

4.F

5.F

6.T

B. 1. correct order (2), (4), (3), (1)

2. words / phrases which refer to the reduction of car emissions:

- clean up the smoke coming out of their exhausts
- combat smog
- exhaust gas recirculation
- diesel particulate filters
- AdBlue-based selective catalytic reduction technology

STAGE 4 – APPLYING THE KNOWLEDGE

Objectives

content objectives	language objectives	culture objectives
✓ to identify aspects of cities related to automotive technology ✓ to argue the impact of cars upon cities	✓ to develop / recall content-related lexis ✓ to practise writing for academic purposes ✓ to formulate opinions	✓ to find advantages and disadvantages of cars in cities ✓ to evaluate city life aspects from a cultural point of view

Suggested Procedure

1. Students are asked to write a short essay (200–300 words) about the changes automobiles caused in their cities and to imagine the evolution of this aspect of the city in the near future (suggested structure: one topic sentence; three body paragraphs which could refer, for example, to past, present and future or to three aspects of city life determined by the use of automobiles; one concluding paragraph).
2. Students are asked to share both their essays and certain suggestive images on the MUL-TECON platform.
3. Feedback from the teacher will be provided once the teacher has thoroughly checked each essay, paying attention to the academic writing characteristics.

Teacher's Notes

The aim of this activity is to make students reflect on both the advantages and disadvantages of the automotive industry. They may also consider how the negative aspects, such as the impact on people's lives in cities, could be transformed in a positive sense.

The teacher should encourage students to make use of all the information they have received and to think critically so as to express their own opinion.

Extension / Variation

The core of this stage of the lesson features a role-play to be held after an introductory reading activity. The teacher prepares a text about a trend which has seen the replacing humans with robots in key areas of manufacturing and hands it over to the students, asking them to read it carefully (Material 5: Worksheet – *Does the Future of the Automotive Industry Belong to Robots?*). They can also read the text in a PPT projected in the classroom, so that the teacher may make sure that the students have understood the text. Then, the students are put in groups of three and asked to extract characteristics of robots and humans, referring to the automotive industry.

After presenting these features of 'robots *versus* humans' in terms of advantages and disadvantages related to the automotive industry (for each group of three, students choose a

spokesperson to present the results of their work), the teacher, helped by the students, summarises the results on a flip chart.

The teacher organises students into three groups: A. management of Automobile Dacia factory, B. employees of the automotive factory, C. mediators in a possible conflict situation. Each group receives role cards with information relevant to their position. They are asked to formulate arguments for and against the idea of introducing more robots in the factory; and then to discuss the issue, considering the specifics of factory work and the social context.

Teacher's Notes

The aim of this activity is to make students reflect on the idea of replacing human workers with robots in the automotive engineering field and to gain a deeper understanding of related points of view. The teacher should encourage students to express their opinion on the matter, especially during the role-play.

Materials

- Material 5: Worksheet – *Does the Future of the Automotive Industry Belong to Robots?*
- Material 6: Role Cards

Answers

Material 5: Worksheet – *Does the Future of the Automotive Industry Belong to Robots?*

humans	robots
1. perform assembly operations that are customised	1. perform operations in paint and body shops (for instance, with lead-based paint)
2. perform flexible operations (fitting in a variety of electronics and other bells and whistles offered on autos, which requires the flexibility of human workers who can adjust to changing needs and innovations)	2. perform operations with safety and ergonomic challenges
3. People can do anything. You just need to train them.	3. perform repetitive operations more efficiently and economically

STAGE 5 – SUMMING UP

Objectives

content objectives	language objectives	culture objectives
✓ to check the content acquisition by revising the main features related to the two types of the cities	✓ to check the main vocabulary areas related to cities	✓ to revise the main elements of the city scenery

Suggested Procedure

1. The teacher asks students to write a sentence summarising the concept of preindustrial walking cities and another one summarising the concept of automobile city.
2. The students are asked to underline three key-words related to preindustrial walking / automobile cities in the sentences they were asked to write.
3. The students are asked to read the three key-words they have identified.

Teacher's Notes

This stage of the lesson comprises three activities which are designed with a view to check the skills that the students have practised during the lesson.

The aim of this stage is to sum up the content knowledge acquired by the students on the topic, and also to make them aware of the skills they have practised and of the new concepts / opinions they have learnt.

The teacher should stress that the topic is very important and that further investigation is warranted.

Unit 2: Teaching Materials

Topic: smart cities and autonomous vehicles

Level: B2

Skills: speaking, listening, reading, writing

Timing: ~ 90 min.

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. can identify main issues related to smart cities. ✓ Ss. can identify and articulate common concepts concerning transportation. ✓ Ss. can successfully use language to acquire, summarise and evaluate automotive engineering-related concepts.	✓ Ss. have a better understanding of the way professional culture in the field of engineering functions. ✓ Ss. can communicate when dealing with other professional, national cultures.	✓ Ss. can formulate and present public statements about the impact of cars upon cities (inhabitants) and environment. ✓ Ss. can make hypotheses and support an idea.

Unit progression at a Glance:

unit stage	time	interaction patterns
1. warm-up (transportation in cities – dialogue)	~ 10 min	individual work / pair work / T-Ss. (to initiate and follow up)
2. setting the scene (issue of congestion)	~ 15 min	individual work / pair work / T-Ss. (to initiate and follow up)
3. analysing the problem (autonomous vehicles as one possible solution to urban congestion)	~ 30 min	individual work / pair work / group work / T – Ss. (to initiate and follow up)
4. applying the knowledge (role-play)	~ 30 min	group work
5. summing up (solution proposals and voting)	~ 5 min	group work

Materials

- Material 7: Worksheet – *Car Invasion?*
- Material 8: Worksheet – *What if…?*
- Material 9: Worksheet – *When Will Autonomous Vehicles Become Reality?*
- Material 10: Video – *Let's Ban Cars! (Seriously)*
- Material 11: Role Cards

STAGE 1 – WARM-UP

Objectives

content objectives	language objectives	culture objectives
✓ to identify the main characteristics of autonomous vehicles ✓ to support ideas related to the topic	✓ to develop content-related vocabulary related to transportation in cities ✓ to practise free speaking on the topic of transportation in cities	✓ to indicate elements of the city scenery impacted by automotive technology ✓ to provide opinions for and against-smart-city features

Suggested Procedure

1. The teacher introduces the topic of the lesson by telling students they will share their ideas about the smart city and their means of transportation, including the “cars of the future”.
2. The students are given a worksheet (Material 7: Worksheet – *Car Invasion?*) which includes a set of images and a text.
3. The students are asked to identify the phrases related to the space allocated to transportation in cities, to group and compare them (cars versus other means of transportation) and add more.
4. Students share their answers and opinions with the whole class. The teacher writes key ideas and useful phrases on the board, and teacher elicits correct phrases (based on the notes taken while monitoring).
5. The teacher monitors and helps with content / language and notes down good language use and common mistakes.

Teacher’s Notes

This stage aims to introduce the topic of the lesson. The teacher should encourage students to express their opinions and to freely share their views regarding the topic of the lesson, i.e., means of transportation in cities and all the aspects related to this issue. An open dialogue during this stage of the lesson should create premises for a fruitful debate during the following stages of the lesson.

After students are presented with the text and the set of pictures representing transportation aspects in a city, they should explain the reasons for their opinions.

Materials

- Material 7: Worksheet – *Car Invasion?*

Answers

Material 7: Worksheet – *Car Invasion?*

A. Multiple possible answers: Cities have always been designed with a view to ensuring transportation by cars. As a result, there has been a huge increase in the number of cars. Consequently, there has been an extension of road infrastructure to the detriment of green areas. A lot of parking spaces have been created accommodate cars. Today, the urban landscape is therefore deeply connected with cars.

B.

cars	other means of transportation
parking lots	sidewalks
streets	streets
service stations	
driveways	
signals and traffic signs	

STAGE 2 – SETTING THE SCENE

Objectives

content objectives	language objectives	culture objectives
✓ to identify aspects of cities related to transportation ✓ to discuss the impact of cars upon cities, focusing on identifying the best solutions for the different issues that a city may encounter in terms of transportation	✓ to develop / recall content-related functional language ✓ to practise free speaking	✓ to find solutions to real-life issues ✓ to evaluate a working hypothesis

Suggested Procedure

Based on the ideas the students have formulated during the previous activity, they are challenged to answer the following question: Are cars and cities a bad match?

1. Students are given Material 8: Worksheet – *What if…?* and are asked to accomplish the tasks.
2. Students are invited to communicate their ideas.
3. The teacher helps with content / language, when required.

Teacher's Notes

The main teaching method in this stage of the lesson is critical thinking as the aim of this stage is to make students come up with solutions for a series of problematic aspects regarding transportation in cities, partially identified during the previous stage. The teacher should also monitor the aspects related to functional language involved in this stage of the lesson.

Materials

- Material 8: Worksheet – *What if…?*

Answers

Material 8: Worksheet – *What if…?*

a) Since a city is a place where people live close together, there's not much space per person. If each person had a car, then the number of cars on the streets would definitely be higher than what we see today.

b) Cars take up a lot of space per person. If the number of inhabitants in a city increases, the spaces assigned to for cars will have to grow proportionally.

c) If more parking lots are needed, the solution for local authorities will be to extend the parking space by destroying more urban green areas.

d) A city would stop growing if congestion disappeared as this would mean there are no cars on the streets taking employees to work or transporting products from one place to another.

e) Local authorities could widen streets if land in cities were not so expensive / were cheaper than it is.

f) Mass transportation would be a solution to congestion in cities if buses had flexible schedules and affordable fares.

g) Urban stakeholders would ban cars in the city unless the citizens protested against travelling with others, walking or cycling / preferred using cars to walking, cycling or using public transportation.

h) If a significant number of people gave up cars, the solution for their transportation would be a less expensive public transport system (buses, trams, underground).

STAGE 3 – ANALYSING THE PROBLEM

Objectives

content objectives	language objectives	culture objectives
✓ to identify aspects of congestion in cities ✓ to examine the specificities of autonomous vehicles ✓ to discuss the impact of congestion in cities	✓ to develop / recall content-related language ✓ to develop listening skills ✓ to identify for / against reasons on the issue of congestion	✓ to find advantages and disadvantages of autonomous cars in cities ✓ to evaluate solutions to congestion in future cities

Suggested Procedure

1. Students are invited to watch a video about one solution to the issue of congestion in the 21st century cities (Britmonkey, 2020). They are asked to pay attention to the arguments the author formulates.
2. Then they are asked to form groups of 3–4 students and to write down as many arguments as they remember; and then to come up with as many counter arguments as they can.
3. Each group has a flip chart; and a representative of the group can present the results.
4. The teacher gives each group of students worksheets (Material 9) which contain a copy of an article and asks them to work in groups to accomplish the tasks.
5. Using the information offered by the text, students are asked to work in groups to formulate 10 statements about certain aspects related to autonomous vehicles.
6. The students are then asked to present the results of their work in groups to the others and discuss them.

Teacher's Notes

This stage of the lesson comprises two activities which are designed with a view to developing students' language skills by way of content-driven and multidisciplinary teaching process.

The first activity aims to introduce students to various solutions to the issue of congestion in 21st century cities. The specific objective of the first activity is to make students find arguments for and against an opinion expressed by someone and to enable them to analyse a set of statements in a critical way. The teacher should focus on the variety of the arguments listed by the students after watching the video, as well as on the structure and diversity of their formulated counterarguments.

Discussing the results should contribute to an increased awareness of the contemporary problematic issues that both the authorities and citizens are having to contend with.

The second activity focuses both on language skills development and on making students more familiar with the specific aspects (and specific vocabulary) of increased use of autonomous vehicles in near future cities. Its aim is also to encourage students to express their original solutions.

Materials

- Material 9: Worksheet – *When Will Autonomous Vehicles Become Reality?*
- Material 10: Video – *Let's Ban Cars! (Seriously)*

Answers

Material 9: Worksheet – *When Will Autonomous Vehicles Become Reality?*

B.

How autonomous vehicles function:

- Autonomous vehicles are those vehicles that can function without human assistance. However, true autonomous vehicles are actually much further off than many people seem to think.
- Self-driving (autonomous) cars have to make decisions that are not just technical or logistical, but ethical as well, focusing on the less harmful solution at a certain moment.

Their impact on the shape of the city:

- The ability that autonomous cars have to pick people up and drop them off means that "car parks could be located in cheaper, out of town locations", which impacts the shape of the city.
- For example, the transport committee of the London Assembly has poured cold water on the prospect of using autonomous vehicles in their city any time soon, particularly given the paucity of the studies in the field.

Their impact on people's lives:

- The advent of self-driving cars is likely to result in a paradigm-shift that will drastically alter our understanding of what 'a car' is.
- Some people fear that, once autonomous cars are used on a large scale, they will take control over people's lives.

The benefits they could bring:

- There are studies that shed light on the multiple benefits that autonomous cars could bring in terms of greater convenience, efficiency and reliability, reduced pollution and emissions.
- Only after autonomous cars are let loose on the streets of smart cities, will the benefits of using them be proved.

The aspects that could be criticised:

- In spite of the fact that autonomy will always have constraints, testing autonomous cars should go on in those cities which get ready for the challenges of the 21st century.
- Waymo, the company that came out of Google's self-driving-car project, came to the conclusion that autonomous cars are not ready yet to be used without human assistance.

STAGE 4 – APPLYING THE KNOWLEDGE

Objectives

content objectives	language objectives	culture objectives
✓ to identify aspects of cities which may lead to congestions ✓ to argue on the advantages of autonomous / electric cars	✓ to develop / recall content-related language, adapted to an official situation (vocabulary / formulae) ✓ to practise free speaking ✓ to formulate opinions, suggestions related to the advantages of electric / autonomous cars	✓ to find solutions when playing a certain role ✓ to evaluate city life aspects from a cultural perspective

Suggested Procedure

1. Using a flip chart, the teacher presents a hypothetical situation to the students: In your city the problems generated by using cars, such as traffic jams, pollution, parking issues, not to mention the disappearance of parks and green zones, had led to a very difficult situation. Today your city is more congested than ever. The local authorities have organised a meeting with citizens and stakeholders in order to discuss possible solutions (autonomous driving, electric vehicles, ride-sharing, mass transit).
2. Students will engage in a role-play. They are given cards (Material 11: Role Cards) with instructions for each role: Stakeholder(s), Mayor, City Hall Council member(s), Representative(s) of the automotive industry in the region, Representative(s) of an environmental NGO, Citizen(s).

Teacher's Notes

The aim of this activity is to make students reflect on the advantages and disadvantages of autonomous / electric cars. They have also to evaluate the impact of other proposed solutions, such as mass transit and ride-sharing, as they have to assess their partners' views on the direction their city should develop towards.

The teacher should facilitate the students in terms of their gaining a deeper understanding of the multiple points of view related to the issue. The teacher should encourage students to express their opinion on the matter especially during the role-play, to argue for and against a certain issue according to the role they are assigned.

Materials

- Material 11: Role Cards

STAGE 5 – SUMMING UP

Objectives

content objectives	language objectives	culture objectives
✓ to check the content acquisition by assessing the solutions proposed	✓ to check the main vocabulary / language areas related to cities	✓ to raise awareness on choosing a certain solution when an issue is raised

Suggested Procedure

1. The teacher asks students to vote for the solutions proposed during the role-play activity in the previous stage of the lesson.
2. If students express the desire to continue the discussion “as themselves”, they should be given the opportunity to talk about the topic while taking their personal attitudes and views into consideration.

Teacher’s Notes

This stage of the lesson is designed with a view to making students aware of the content knowledge they have gained on the topic, but also of the skills they have practised; and of the new concepts / opinions they have found out about, consolidating the students’ communication skills and raise their awareness of the topic.

2.3.3 Student Materials Automotive Engineering

Material 1: PPT Presentation – *Stages of the City*

Stages of the city

PITESTI

PITESTI IN HISTORY

Please take a look at the following pictures. They represent the same city, Pitesti, but in different periods of time. Pay attention to the elements of the setting and express your first impression when comparing them.

Pitesti then

Pitesti, central market
http://www.miscarea.net/apto-pitesti.htm

Pitesti then

Pitesti, central street
http://www.miscarea.net/apto-pitesti.htm

PITESTI IN HISTORY

Pitesti then

Pitesti, railway station
https://adevarul.ro/stiri-locale/pitesti/foto-cum-a-crescut-pitestiul-in-ultimii-70-de-1541440.html

Pitesti then

Pitesti, St. George's Church
http://alexserban.ro/proiecte/pitestiul-urbanizat/

PITESTI IN HISTORY

Pitesti now

Pitesti, Republicii Boulevard
https://epitesti.ro/stiri/stiri-diverse/noile-tarife-rca-cresteri-pentru-toate-categoriile-de-autovehicule

Pitesti now

Pitesti road belt
https://www.news.ro/social/aglomeratie-pe-autostrada-bucuresti-pitesti-dar-si-pe-mai-multe-drumuri-nationale-din-cauza-numarului-mare-de-masini-care-se-indreapta-catre-capitala-video-19224039090020180416180567 10

You may also access the presentation here: https://docs.google.com/presentation/d/1mif8ykOdCLorAzbkr739i4JCVP7sYADO/edit#slide=id.p1

Material 2: Worksheet – *Two Types of Cities*

A. Get a better image of the pre-industrial walking city as well as of the automobile city by putting the features below in the appropriate column.

pre-industrial walking city	automobile city

- leads to traffic congestion
- uses fewer fossil fuels
- requires more infrastructure and produces more waste
- produces less air pollution and noise pollution
- encourages walking, biking, and public transportation
- increases the amount of land devoted to parking
- increases the amount of air pollution
- provides additional land for green space that is not being used by vehicles

B. Think about other features you may add, then put them in the right column.

Material 3: Worksheet – *Cars and Cities: A Good Match?*

Think about the impact of cars and automobile technology upon the cities, referring to each of the domains below; and write down as many statements as you can in the appropriate column:

domains					
	streets	**green zones**	**buildings**	**health**	**economy (with respect to jobs and incomes)**
advantages					
disadvantages					

Material 4: Worksheet – *The Issue of Pollution*

A. After reading the text below, decide whether the following statements are true or false.

	TRUE	FALSE
1. The majority of CO2 released into the atmosphere results from the use of vehicles.		
2. Certain engine modifications could contribute to reduce gas emissions.		
3. The air-fuel ratio determines the level of emissions from vehicles.		
4. A catalytic converter refers to a modification of the engine of a vehicle.		
5. Only vehicles may be equipped with a catalytic converter.		
6. In the treatment of automobile exhaust gas, both base metals and noble metals are used.		

The emissions of pollutants from vehicles are generally low, but the number of vehicles on our roads is in-creasing therefore environmental pollutions are also on the increase. About 35 % of CO, 30 % of HC and 25 % percent of NOx produced into the atmosphere comes from the transportation sector. These pollutants have adverse effects on the environment and human health. The emissions from vehicles are generally dependent upon the air-fuel ratio. The control techniques for exhaust gas emissions are engine modifications, fuel pre-treatment, fuel additives, exhaust gas recirculation (EGR), positive crank-case ventilation (PCV) and an application of catalytic converters. A catalytic converter is a device that converts more toxic exhaust gas pollutants into less toxic pollutants. There are different types of catalysts used in the automobile exhaust gas treatment like noble metal and base metal catalysts etc. The catalytic converter was consistently effective in reducing noxious tailpipe emissions, so it was developed for use in trucks, buses, cars, motorcycles and other construction equipment.

Glossary of abbreviations:

CO – carbon monoxide; HC – hydrocarbons; NOx – nitrogen oxides

Dey, S., & Mehta, N. S. (2020, December). Automobile Pollution Control Using Catalysis. *Resources, Environment and Sustainability*, Vol. 2. https://www.sciencedirect.com/science/article/pii/S2666916120300062

B. 1. Read the following paragraphs and put them in the right order.

(1) Today, the overwhelming majority of internal combustion engine cars on the road have a catalytic converter and there are various different kinds fitted to different models. Many cars also have supplementary systems such as exhaust gas recirculation, diesel particulate filters and AdBlue-based selective catalytic reduction technology that work with the 'cat' to help clean car exhaust emissions further.

(2) Catalytic converters have been around since the 19th century when metal cylinders containing filters coated in platinum, iridium and palladium were fitted to early French motor cars in an attempt to clean up the smoke coming out of their exhausts.

(3) Having already fitted his filters to warehouse forklift trucks, by the 1950s Houdry had begun to research catalytic converter technology for use on cars and he secured a patent for his design in 1956. The use of the technology on production cars didn't become widespread until lead, which blocks the chemical reaction that takes place within catalytic converters, was removed from petrol and the hands of the manufacturers were forced by tightening car emissions regulations.

(4) The technology was first patented by Frenchman Eugene Houdry who relocated to Los Angeles in the 1930s and founded a company called Oxy-Catalyst, which fitted catalytic converters to industrial chimneys to combat smog.

Walker, S. (2021, May 14). Catalytic Converters Explained. How They Work and Theft Prevention. *Auto Express*. https://www.autoexpress.co.uk/car-news/108937/what-is-a-catalytic-converter

2. Select at least 5 words / phrases which refer to the reduction of car emissions.

Material 5: Worksheet – *Does the Future of the Automotive Industry Belong to Robots?*

How do humans and robots fit into the automotive industry? Please read the text below carefully and identify all possible actions that are performed by each of the two agents (humans, robots). For future reference, you may fill in the information in the table placed after the text.

Surprise: Robots Aren't Replacing Humans in Key Areas of Manufacturing

For workers, it's intimidating to hear of industrial digitization plans that envision handing over anywhere from 60 to 80 percent of processes to robots and other programmable machines in the not-too-distant future. But while there are certainly highly repetitive jobs which bots would perform more efficiently and economically, automating alone is not always the best path to higher productivity.

Smart organisations learn quickly enough that if they place efficiency above a smooth organisational transformation, they may find their automation efforts fail to improve their companies' performance. The real key to developing a competitive edge in an age of evermore automation is striking the right balance between people and robots, and evidence abounds that it's not necessarily the most automated factories or service organisations that rise to the top.

The automotive industry, among the first to embrace robots in the manufacturing process, provides a working example of why companies cannot simply replace employees or fail to retain and retrain. Stark productivity differences exist between the industry leaders and laggards, in large part based on the efficacy of their automation efforts. One result: Some automakers require as much as six months to transition to producing a new vehicle, while others need no more than a day.

At the root of the discrepancy is an appreciation of which jobs robots do more efficiently and which require a human touch. Leading car companies have almost completely automated their paint and body shops. These are jobs that require constant repetition and consistent quality and often present safety and ergonomic challenges. Although lead-based paints aren't used anymore, working in these areas could still expose workers to a bevy of unhealthy chemicals, making these the quintessential kinds of jobs that robots have been designed to handle.

On the other hand, assembly lines — which must deal with the multitude of options on new models from side airbags to built-in vacuum cleaners — continue to heavily rely on a human workforce. To handle today's highly customised vehicles, with as many as 55,000 parts for the variety of electronics and other bells and whistles offered on autos, requires the flexibility of human workers who can adjust to changing needs and innovations without extensive reprogramming. (…)

To bring along employees, managers must introduce automation in steps. If they go too far too fast, they risk losing critical know-how as employees jump ship or are pushed off. A priority must be identifying and retaining the employees critical to re-engineering processes down the road — as well as those people needed to ensure the effective management of the bots and automation just incorporated into the workflow.

Wyman, O. (2017, February 3). Surprise. Robots Aren't Replacing Humans in Key Areas of Manufacturing. *Forbes*. https://www.forbes.com/sites/oliverwyman/2017/02/03/surprise-the-correct-answer-is-not-always-to-go-with-the-robot-just-ask-some-automakers/?sh=23597ba4120a

humans	robots

Material 6: Role Cards

The senior management of the Automobile Dacia factory is currently considering the possibility of introducing more robots on the production line. This is supposed to happen really soon. The representatives of the employees have invited to a discussion on that topic with the senior managers. A mediator will also be present at the discussion, as required by legislation.

Here are some suggestions for the dialogue:

Management of the Automobile Dacia factory

- greater productivity
- smaller costs

Employees of the Automobile Dacia factory

- employment contract provisions
- line positions
- future perspectives

Mediators in a possible dispute situation

- conformity with the legislation
- encourages genuine dialogue between the 2 parties
- tries to reach a compromise

Material 7: Worksheet – *Car Invasion?*

A. Look at the following images and notice the space allocated to transportation in cities, then come up with ideas and share them:

Figure 1: At blue hour

Figure 2: Google Maps updates its application with new features.

Figure 3: “Feeding” the car

Figure 4: A(n) (express)way

Figure 5: A necessary facility

B. Read the following text and identify the phrases related to the space allocated to transportation in cities. Group them (cars versus other means of transportation) and add other categories, if necessary. An example has been provided in the table placed after the text.

The Reshaping of City Cores That Were Designed for Cars 2019

The advent of the mass-produced automobile in the early 20th century created unpredictably powerful ripples in the design of cities that continue to resonate today. When cars originally appeared, they shared the roads with the prevailing transportation mix of the time: horses, carriages, bicycles, pedestrians and the like. Unsurprisingly, the "horseless carriage" didn't function well in the existing traffic matrix. In other words, the private automobile didn't play well with others.

Fast forward a few decades, and the impact of the car on American cities was already writ large. Dr. Martin Melosi, director of the Center for Public History at the University of Houston, wrote: "It is estimated that as much as one half of a modern American city's land area is dedicated to streets and roads, parking lots, service stations, driveways, signals and traffic signs, automobile-oriented businesses, car dealerships, and more. Equally significant, space allocated for other forms of transportation ultimately shrank or disappeared. For example, sidewalks—normally considered essential to separate pedestrians from various transportation modes—were less often constructed along many urban roads and streets in the automobile era." (…)

Melosi pointedly contended that: "Urban sprawl in post-World War II America did not follow a clear, consistent pattern of outward development, however, but a kind of 'leapfrog nature of urban growth' that scattered people, businesses, and industry over a broad landscape with substantial patches of vacant or empty land interspersed among tracts of homes, commercial strips along roadsides, and a variety of low-density uses of various types." This ramshackle form of urban development further reinforced the average American consumer's constant need for their own private car, and it didn't end there.

Frazer, J. (2019, August 6). The Reshaping of City Cores That Were Designed for Cars 2019. *Forbes*. https://www.forbes.com/sites/johnfrazer1/2019/08/06/the-reshaping-of-city-cores-that-were-designed-for-cars/?sh=5d6b12841e46

cars	other means of transportation
parking lots	sidewalks

Material 8: Worksheet – *What If…?*

Based on your own experience and knowledge, please continue the following sentences:

a. Since a city is a place where people live close together, there's not much space per person. If each person had a car, then…

b. Cars take up a lot of space per person. If the number of inhabitants in a city increases, the space for cars…

c. If more parking lots are needed, the solution for local authorities…

d. A city would stop growing if congestion…

e. Local authorities could widen streets if land in cities…

f. Mass transportation would be a solution to congestion in cities if buses…

g. Urban stakeholders would decide to ban cars in the city unless the citizens…

h. If a significant number of people give up cars, the solution for their mobility …

Material 9: Worksheet – *When Will Autonomous Vehicles Become Reality?*

A. Read the following text carefully.

Q&A: 5 Key Questions about Autonomous Vehicles

When Will Autonomous Vehicles Become Reality?

Well, they already are. Testing is going on across the globe, but at the end of last year, Waymo, the company that came out of Google's self-driving-car project, began running self-driving car services for paying customers in the US state of Arizona.

However, the vehicles used in Waymo's commercial project are still manned by a safety driver who's on hand to take the wheel should anything go wrong. What's more, some prominent critics, including Apple co-founder Steve Wozniak, have publicly warned that true autonomous vehicles that can function totally without human assistance are actually much further off than many people seem to think. Even Waymo's own CEO, John Krafcik, has said that "autonomy will always have constraints."

Should they be allowed on public roads?

It depends who you ask. In 2018 California's department of Motor Vehicles started allowing car makers and tech firms to test autonomous vehicles on public roads. In most cases, these test vehicles are manned by a human driver who can take control if 'a failure of the autonomous technology is detected'. But in October 2018, California's Department of Motor Vehicles gave the all-clear for Waymo to test self-driving cars on public roads without a human in the driver's seat.

In other countries and jurisdictions, law-makers have been less enthusiastic. Despite the British government predicting that connected and autonomous vehicles (CAVs) would be on UK roads by 2021, the transport committee of the London Assembly has poured cold water on the prospect of the vehicles being let loose on the streets of the capital any time soon.

A report published last year said: "There is much hype around CAVs becoming a feature of our roads in the imminent future. This is not likely to be the case, with 2030 to 2040 more realistic for widespread rollout." It's thought that the Mayor of London, Sadiq Khan, wants to prioritise a culture of car-sharing before focusing on autonomous technology.

How will they change our lives?

For one thing, they could re-shape our cities. In a series on the potential impacts of autonomous vehicles, accountancy firm KPMG suggested that driverless cars' ability to pick people up and drop them off on demand means that "car parks could be located in cheaper, out of town locations". Azeem Azhar of the Exponential View has said that advanced control systems could make it possible for cars to be 'platooned', travelling along roads bumper-to-bumper, even at great speed. Both of these things would drastically reduce the space required for cars, and could lead to pronounced changes in town planning and the design of cities.

Meanwhile, Tom Goodwin, author of Digital Darwinism, argues that the advent of self-driving cars is likely to result in a paradigm-shift that will drastically alter our understanding of what 'a car' is. Cars could be transformed from things that we use to get from A to B into spaces where we have meetings, sleep, or even get dentistry work done. (He's serious.)

How will they work?

The best way for truly autonomous vehicles to function, and the amount of processing power and data required, is still open to debate. However, it also seems likely that self-driving cars will have to make decisions that are not just technical or logistical, but ethical as well.

What happens, for example, in situations in which some kind of accident is inevitable?

It seems intuitive to programme autonomous cars to preserve as many human lives as possible, but what if there's a choice between preserving the life of two innocent bystanders, or three people in a car that has broken multiple traffic laws? And is it better to swerve to avoid one pregnant woman, or three elderly men all in their nineties?

A team of psychologists and computer scientists from MIT decided to crowd-source the views of real people via a website and questionnaire called 'The Moral Machine'. The findings, which were published in the journal Nature, aren't intended to directly influence the design of autonomous vehicles, but they do shed light on some of the complications that might arise.

Who will be the early adopters?

Generally speaking, new consumer technology tends to be embraced first by young, wealthy, metropolitan people. But that assumption might not hold true for autonomous vehicles.

Voyage is a Silicon Valley start-up that's betting on the elderly being a significant early market for self-driving cars. The company is testing its autonomous vehicles (AVs) in The Villages, a retirement community of 125,000 people in Florida. According to Voyage CEO Oliver Cameron, the simple, easy-to-navigate streets of The Villages, as well as its residents' requirements for transport solutions mean that it could be the ideal place for the technology to enjoy widespread adoption. 'We expect it to be the first city in the world to adopt AVs as the primary means of transport," he said.

Gett. (2019, June 10). Q&A. 5 Key Questions about Autonomous Vehicles. *Gett*. https://gett.com/blog/qa-5-key-questions-about-autonomous-vehicles/

B. Using the information provided in the text, formulate 10 statements about:

- how the autonomous vehicles function;
- their impact on the shape of the city;
- their impact on people's lives;
- the benefits they could bring;
- the aspects that could be criticised.

Use a different phrasal verb from the text in each statement.

Material 10: Video – *Let's Ban Cars (Seriously)*

BritMonkey (2020, 1 May). *Let's Ban Cars! (Seriously)* [Video file]. Retrieved from https://www.youtube.com/watch?v=rSSNlM3Au1A

Material 11: Role Cards

In your city, the problems caused by the excessive use of cars (traffic jams, pollution, a shortage of parking lots, parks and green zones) has led to a congestion of the city and growing unrest among its inhabitants. The local authorities have organised a meeting with citizens and stakeholders in order to discuss possible solutions, such as autonomous driving, electric vehicles, ride-sharing, public transport options.

Please read the instructions on the role cards carefully. Think about the advantages and disadvantages of each of the possible solutions and the position you have been assigned during the roleplay. Play the role accordingly.

Mayor & City Hall Council member(s) – have to listen to the participants' opinions and think of ways in which the institution could intervene and help resolve the issue, for example by promoting public transport and thereby reducing the use of private cars.

Citizen(s) 1 – quite dissatisfied with the time spent in traffic on their way to work. There are mornings in which they spend over ninety minutes stuck in traffic jams and get to work late, which is frowned upon by the boss.

Citizen(s) 2 – go to work by bike every morning but have had many safety incidents with careless drivers who give them little or no consideration.

Citizen(s) 3 – comfortable with going to work by car, as there are no means of public transportation in the neighbourhood.

Representative(s) of a local automotive company – the support for public transport may decrease the company's sales.

Representative(s) of an environmental NGO – they are pleading for more environmental protections and a reduction in pollution levels.

2.3.4 Appendix

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2.4 Biomedical Sciences and Health Communication

Vaccination – Ethics and Childhood – A Contemporary Glocal Issue

These units have been designed for students who are interested in increasing their linguistic repertoire, while expanding their academic content knowledge within the domain of Biomedical Sciences. Thus, both units seek to contribute to the personal and academic development of students who are culturally aware of their surroundings and offer culture-oriented activities to be used in class or independently by students.

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2.4.1 Introduction

What is this Module About?

This module focuses on the field of Biomedical Sciences and Health Communication, with a particular focus on contributing to the education of culturally diverse students, raising awareness of cultural differences and respect for them. The module also explores ethical issues.

The activities in Units 1 and 2 are academic and culture-driven focusing on the scientific domain of bioengineering and the subsequent ethical concerns. Additionally, the activities are language sensitive, building on lexis and vocabulary.

This module pays particular attention to the mediation aspects of language learning. For this, we suggest the use of a) mediation strategies (to explain new concepts and to simplify texts); b) mediation activities (relaying specific information and note-taking), mediating concepts by collaborative interaction with peers to construct new meanings and by managing the interaction, and facilitating communication in case of potential disagreements. In addition, the module follows the theoretical framework of the TE-Con3 approach in pluriliteracies thinking skills, Postmethod, CLIL and intercultural communicative competence. It can be assessed with interaction and mediation descriptors.

Students are encouraged to freely and safely brainstorm language structures pertaining to the suggested topic, ethics and childhood vaccination. Meanwhile, the teacher may act as a mediator and guide; and as such, answer any doubts students may have.

Overall, the aim of this module is to promote the acquisition and use of the target language, as well as pertinent knowledge, through interactive, small-group and/or large-group activities. It is expected that by completing the suggested activities, both students and teachers will develop a greater awareness of two key current issue: ethics and childhood vaccination and bioengineering. Ideally, the goal of the module is to increase understanding of both issues, while acquiring the necessary language with which to fully participate in discussions relating to these issues; and with particular regard for a multicultural and multilingual society.

Module Structure and Implementation

Unit 2 includes four stages (*warm-up*, *introducing the topic, analysing the topic* and *producing a text*) to be completed in approximately 90 minutes. Activities can take place on-site and/or online using the MUL-TECON platform. Teachers can easily replace online resources (e.g., Jamboard) with on-site alternatives. Units may be used separately, or as suggested. Following the TE-Con3 framework, the activities are academic (i.e., targeted at tertiary level students' linguistic development), culture-oriented (i.e., enabling different ethical concerns towards vaccination and/or bioengineering) and language sensitive (i.e., using language skills and knowledge to evaluate the social functioning of vaccination and bioengineering).

Language Levels and Scaffolding Options

The activities in the module can be used to assess students' speaking, reading and writing skills. The assessment descriptors of the CEFT for levels B2–C1 may be adapted to the specific needs and objectives of the teaching and learning experience. For instance, for a B2 or lower level, the reading comprehension activity suggested in Unit 1 may be used as a guided read-aloud for the entire class, allowing the teacher to scaffold meaning and comprehension. Similarly, the final writing activity for Unit 1 can be transformed into a debate, allowing students to build up the language necessary for giving opinions and the corresponding justifications.

2.4.2 Teaching Guidelines Biomedical Sciences and Health Communication

Unit 1: Teaching Guidelines

Topic: Vaccination – Ethics and Childhood

Level: B2

Skills: speaking, listening, reading, writing (integrated)

Timing: ~ 90 min. of study

Planned Learning Outcomes:

	TO KNOW	**TO VALUE**	**TO ACT**
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. can acquire the necessary linguistic structures, while working on specific content. ✓ Ss. can discuss aspects pertaining to the ethics of vaccinations in childhood. ✓ Ss. can utilize appropriate language.	✓ Ss. can better comprehend the cultural nuances that may affect the issue. ✓ Ss. can further develop their communicative needs by dealing with a variety of cultural issues.	✓ Ss. can generate adequate language for the area of Biomedical Sciences and Health Communi-cation. ✓ Ss. can negotiate and reach a compromise.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. brainstorming	~ 15 min	group work
2. follow-up reading comprehension	~ 30 min	individual work
3. writing – giving an opinion	~ 30 min	individual work
4. summing up	~ 15 min	discussion with the entire class

Materials

- Material 1: Worksheet – *Vaccination: Ethics and Childhood*
- Material 2: Extension Activity – *Vaccination around the World*
- Material 3: Variation Activity – *Vaccination and Our Rights*
- Material 4: Worksheet – *Vocabulary Assessment*
- Material 5: Worksheet – *Vaccination, a Social Responsibility?*
- Material 6: Worksheet – *Understanding Social Responsibility*
- Material 7: Worksheet – *Mandatory or Voluntary? You Decide!*

STAGE 1 – BRAINSTORMING

Objectives

content objectives	language objectives	culture objectives
✓ to introduce the content ✓ to analyse and communicate specific information about the content	✓ to expand / recall content-related language (vocabulary) ✓ to freely practice speaking and writing about a topic in the field of Biomedical Sciences	✓ to build a personal view of a social topic ✓ to elaborate on the societal impact of a social practice

Suggested Procedure

1. The teacher asks students what comes to their mind when they think of vaccinations (Material 1).
2. The teacher explains to the students that in groups of four they will think of words, phrases, or ideas related to the topic.
3. The teacher distributes a worksheet (Material 1), where the role of each student within the group is explained and assigned.
4. The teacher makes sure students understand their roles and contribute to the discussion.
5. The teacher acts as a facilitator while students work in groups, helping with language, and registering examples of good / problematic language use.
6. Students share their answers and opinions with the whole class, as the teacher writes key ideas and useful phrases on the board and elicits correct phrases (based on the notes taken while monitoring).
7. The teacher encourages follow-up discussion.

Extension / Variation

1. The extension activity, *Vaccination around the World* (Material 2), may be assigned as homework, as independent or small-group work, as suggested.
2. The variation activity, *Vaccination and Our Rights* (Material 3), may be completed as a warm-up activity in which students are asked to contribute orally or through an online forum to the discussion of the quote provided. However, if the teacher prefers, it may be used as a follow-up activity to the previous extension (see Material 2), where students use the research gathered to respond in a more formal, individual writing activity.
3. The activity suggested in the Worksheet – *Vocabulary Assessment* (Material 4), is suggested as a final assessment activity. Depending on the students' level, the activity can be differentiated by soliciting the use of specific number of words (i.e., 10 words for a lower-level student and 20 words for a more advanced student). The teacher may opt to provide students with written feedback, and/or take the opportunity to conduct individual writing conferences with the students.

Materials

- Material 1: Worksheet – *Vaccination: Ethics and Childhood*
- Material 2: Extension Activity – *Vaccination around the World*
- Material 3: Variation Activity – *Vaccination and Our Rights*
- Material 4: Worksheet – *Vocabulary Assessment*

STAGE 2 – FOLLOW UP READING COMPREHENSION

Objectives

content objectives	language objectives	culture objectives
✓ to conduct academic research ✓ to identify multicultural beliefs pertaining to ethics in vaccination ✓ to understand content read ✓ to summarise text	✓ to acquire vocabulary pertaining to the topic of ethics and vaccination ✓ to give an opinion using academic language ✓ to justify a personal point of view	✓ to raise awareness of cultural differences in vaccination practices and ethical issues pertaining to this issue ✓ to identify cross-cultural perceptions

Suggested Procedure

1. The teacher hands out a copy of the article (Material 5) for students to read individually. Alternatively, for more advanced students (C1–C2 level), the teacher may project or share the link to the original article with the students.
2. The teacher guides students through a shared reading activity. The teacher may also use this time to emphasise the correct pronunciation of individual words and teach necessary vocabulary.
3. Students read the article and search for the definition of unfamiliar vocabulary. Alternatively, students may ask the teacher for clarification of unfamiliar vocabulary or language structures.
4. Once reading is completed, students answer questions 1–4 (Material 6), individually.
5. The teacher may evaluate the ability of students to answer the questions using appropriate language and understanding of the content of the article.
6. Assessment alternatives: The teacher may consider collecting students' answers in order to give feedback on the language used and content, using criteria such as (a) ability to answer the question; (b) grammatical range and accuracy; (c) lexical resource; and if answers are given orally, (d) pronunciation.

Materials

- Material 5: Worksheet – *Vaccination, a Social Responsibility?*
- Material 6: Worksheet – *Understanding Social Responsibility*

Answers

Material 6: Worksheet – *Understanding Social Responsibility*

1) B – community
2) False. Approval was given during the clinical trials, not after.
3) B – ironically
4) C – decreased mortality rates

STAGE 3 – WRITING – GIVING AN OPINION

Objectives

content objectives	language objectives	culture objectives
✓ to evaluate the argument(s) presented ✓ to recall information and language learned ✓ to restate acquired content	✓ to give an opinion ✓ to organise ideas coherently and cohesively ✓ to revise writing	✓ to assess the *glocal* realities of the issue presented ✓ to identify different points of view ✓ to identify varying cultural perceptions

Suggested Procedure

1. The teacher provides students with the following prompt: Considering the existing scientific knowledge, COVID-19 vaccination should be mandatory for children. To what extent do you agree? (Material 7)
2. Students write individual opinion essays, which can be addressed to the general population. Essays should be between 250 and 300 words.
3. The teacher may opt to advise students to use the vocabulary list (Material 4) and suggested websites for language purposes. Below are useful websites for writing which may be incorporated into the lesson prior to the writing activity.
   - Writing an opinion essay: Cambridge English Qualifications (n.d.). *B2 First for Schools Writing Part 1 (An opinion essay)* [PDF file]. https://www.cambridgeenglish.org/Images/581163-b2-first-for-schools-preparing-for-exam-success-self-study-writing-activities-part-1.pdf
   - How to write an argumentative essay: Purdue University (n.d.). Argumentative Essays. *Purdue OWL*. https://owl.purdue.edu/owl/general_writing/academic_writing/essay_writing/argumentative_essays.html
4. The teacher may choose to assess students' essays according to the following and based on the descriptors for writing of the CEFR for level B2:

- Task response: Does the student fully address all parts of the given prompt? Does the student completely develop and justify a personal point of view with adequate, relevant, and well-supported ideas.
- Coherence and cohesion of writing: Does the organisation affect the reader's comprehension negatively?
- Lexical resource: Does the student use a wide range of suitable vocabulary?
- Grammatical range and accuracy: What kind of structures does the student use? Are these structures error-free and appropriate?

Materials

- Material 7: Worksheet – *Mandatory or Voluntary? You Decide!*

STAGE 4 – SUMMING UP

Objectives

✓ **content objectives**	✓ **language objectives**	✓ **culture objectives**
✓ to develop a glocal understanding of the issue	✓ to practise asking for clarification ✓ to practise summarising ✓ to identify main ideas and be able to discuss	✓ to defend an argument ✓ to understand and respect culturally diverse ideas ✓ to mediate between cultures

Suggested Procedure

1. The teacher encourages the sharing of information and discussion in order to synthesise the issue presented throughout this unit (vaccination, ethics and childhood).
2. Students practise speaking in a safe, mutually respectful environment, while presenting their opinions (those shared in the essay), as well as the knowledge (content and linguistic) acquired through the reading of the article.

Unit 2: Teaching Guidelines

Topic: Bioengineering: Claiming Superpowers

Level: B2–C1

Skills: speaking, listening, reading, writing, mediation (integrated)

Timing: ~ 90 min. of study (plus possible extension / variation activities)

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. can identify ethical issues in the field. ✓ Ss. can identify and articulate common misconceptions concerning bioengineering. ✓ Ss. can successfully use language to acquire / summarise and evaluate domain-related concepts.	✓ Ss. have a better understanding of the impact of biomedical research. ✓ Ss. can argue their point convincingly.	✓ Ss. can formulate and give public statements about the domain, using appropriate linguistic resources. ✓ Ss. can negotiate and reach a compromise.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. warm-up	~ 10 min	group work or entire class
2. introducing the topic	~ 15 min	group work
3. analysing the topic	~ 45 min	entire class
4. producing a text	~ 20 min	individual work

Materials

- Material 8: Discussion – *Bioengineering: What Comes to Mind?*
- Material 9: Worksheet – *What is Bioengineering?*
- Material 10: Video – *TED Talk: Every 6-year-old Needs to Learn Bioengineering*
- Material 11: Video – *The Dark Side of Genetic Engineering (Ft. Everything Science)*

STAGE 1 – WARM-UP

Objectives

content objectives	language objectives	culture objectives
✓ to personalise the content ✓ to activate existing schemata for the content	✓ to expand / recall content-related language (vocabulary / formulae) ✓ to practise free speaking	✓ to identify and articulate conceptions about bioengineering

Suggested Procedure

1. The teacher introduces the topic of the lesson by building a conceptual map of bioengineering (Material 8). The teacher asks students to share ideas, representations, and beliefs about the concept of bioengineering.
2. The teacher writes all the contributions on the board, presenting the main subthemes, possible definitions and how each idea may lead to a general understanding of what bioengineering is.
3. This activity can be developed at home, with students adding other terms and concepts to the conceptual map, using free software to create conceptual maps such as Miro Mind maps (https://miro.com/pt/), for example.

Teacher's Notes

Stage 1 aims at offering different approaches and/or definitions of bioengineering considering the different cultural backgrounds and ethical concerns. Teachers should enable students to pursue distinct vocabulary choices in order to come up with a definition of bioengineering. The teacher may use Jamboard if the activity is conducted online.

Useful websites:

- The University of Toledo (n.d.). *What is Bioengineering?* University of Toledo. https://www.utoledo.edu/engineering/bioengineering/undergrad/prospective/whatisbioe.html
- Hyun, I. (2020, January 1). *Towards a New Bioengineering Ethics*. Center for Bioethics. Harvard Medical School. https://bioethics.hms.harvard.edu/journal/stem-cell-ethics

Materials

- Material 8: Discussion – *Bioengineering: What Comes to Mind?*

STAGE 2 – INTRODUCING THE TOPIC

Objectives

content objectives	language objectives	culture objectives
✓ to personalise the content ✓ to activate existing schemata for the content ✓ to acquire the domain-specific definition of the content	✓ to expand / recall content-related language (vocabulary / formulae) ✓ to practise free speaking	✓ to connect with emergent questions of the real world ✓ to communicate rigorously specific knowledge

Suggested Procedure

1. Students will first be asked to connect words / phrases from the previous activities in a very synthetic discourse (as required by a definition).
2. After reading the given definition and using theirs as input, the teacher will lead the expression of ideas and arguments to answer the given question.
3. The teacher will ensure equal participation (as much as possible), in order to promote inclusion in class. It is important to pay attention to hypothetic ideological, religious, and political views of the problem.
4. The teacher will present jumbled sentences taken from the text *What is Bioengineering?* and ask students to place them in the correct order (Material 9). Students must match the gaps (1–4) with the letters (a–d).

Materials

- Material 9: Worksheet – *What is Bioengineering?*

Answers

Material 9: Worksheet – *What is Bioengineering?*

Bioengineering is **(1) b.** a discipline that applies engineering principles of design and analysis to biological systems and biomedical technologies. Examples of bioengineering research include **(2) d.** bacteria engineered to produce chemicals, new medical imaging technology, portable disease diagnostic devices, and tissue engineered organs.

Students in bioengineering are trained **(3) a.** in fundamentals of both biology and engineering, which may include elements of electrical and mechanical engineering, computer science, materials science, chemistry, and biology. This breadth allows students and faculty to **(4) c.** specialize in their areas of interest and collaborate widely with researchers in allied fields.

STAGE 3 – ANALYSING THE TOPIC

Objectives

content objectives	language objectives	culture objectives
✓ to personalise the content	✓ to expand / recall content-related language (vocabulary / formulae) ✓ to practise multimodal interpretation ✓ to enhance communicative competence	✓ to identify and articulate preconceptions about bioengineering ✓ to raise awareness of new required competences linked to societal impact of science

Suggested Procedure

1. The aim of this stage is to build on the knowledge and skills from previous stages. The teacher should make clear that there are eight different sections in the TED Talk each containing key ideas. Additionally, the teacher should state that there is logical sequencing in each stage.
2. The teacher will show (twice) a video (overhead projector / computer) of the TED Talk *Every 6-year-old Needs to Learn Bioengineering* (Material 10).
3. The teacher asks students to identify and order the different stages in the talk (Introduction, What is Bioengineering, Missed Opportunity, Bioengineering, Real World Relevance, Priyas Example, Priyas Results and Conclusion)

Materials

- Material 10: Video – *TED Talk: Every 6-year-old Needs to Learn Bioengineering*

Answers

Material 10: Video – *TED Talk: Every 6-year-old Needs to Learn Bioengineering*

1. Introduction
2. What is Bioengineering?
3. Missed Opportunity
4. Bioengineering
5. Real World Relevance
6. Priyas Example
7. Priyas Results
8. Conclusion

STAGE 4 – PRODUCING A TEXT

Objectives

content objectives	language objectives	culture objectives
✓ to personalise the content ✓ to analyse and communicate specific information about the content	✓ to expand / recall content-related language (vocabulary / formulae) ✓ to practise writing about a topic in the field of Biomedical Sciences	✓ to build an own view of a social topic ✓ to elaborate about societal impact of a social practice

Suggested Procedure

1. Students watch a second video (Material 11) by The ScienceVerse, exploring the perils in bioengineering and contrasting with the optimistic view in the first video.
2. Students are asked to produce a text (about 400 words) stating the advantages and disadvantages of bioengineering (students should be invited to reflect on the ethical dimension of bioengineering considering the knowledge from previous stages).
3. The teacher may offer the following guidelines for reflection and/or text production – bioengineering and a) ethics, b) 21st-century education, c) the importance of gender and ethnic equality and d) interdisciplinarity.

Teacher's Notes

The aim of this stage is to practise writing using specific vocabulary and structures under a possible culture-oriented approach to bioengineering. To produce the text students will be allowed to use their own notes from previous activities. Previous stages do prepare students for this final task. The activity has been conceived with regard to culture-oriented and academic aspects. To assess the final product, descriptors from writing (using specific vocabulary and structure) must be used, i.e., students must be able to convey complex and articulated knowledge highlighting the most important points from the previously acquired knowledge. The essay must include a conclusion and the writing style should be relevant to the target reader (formal and argumentative).

Materials

- Material 11: Video – *The Dark Side of Genetic Engineering (Ft. Everything Science)*

Unit 2: Assessment Sheet

Course: Date:

Tick the boxes that apply after teaching this unit and note down comments.

TO KNOW	TO VALUE	TO ACT
A. multidisciplinary B. content-driven C. language-sensitive	D. culture-oriented E. glocal F. academic	G. task-based H. modular I. interactive & performative
☐ Students can identify ethical issues in the field. ☐ Students can identify and articulate common misconceptions concerning Bioengineering. ☐ Students can successfully use language to acquire / summarize and evaluate domain-related concepts, ☐ Students can successfully produce a written text using the appropriate linguistic resources to express a justified opinion on a complex societal issue.	☐ Students have a better understanding of the impact of biomedical research. ☐ Students can satisfy their communicative needs when dealing with other opinions, values, conceptions and beliefs.	☐ Students can formulate and give public statements about the domain, using appropriate linguistic resources. ☐ Students can negotiate and reach a compromise.

My comments:

2.4.3 Student Materials Biomedical Sciences and Health Communication

Material 1: Worksheet – *Vaccination: Ethics and Childhood*

Brainstorming

1. When you think of ***ethics and childhood vaccination***, what comes to mind? In groups of four, students think of words, phrases or ideas related to ethics and childhood vaccination.

   Individual tasks within the group:

   Student A will annotate all the contributions.

   Student B will share the contributions with the class.

   Student C will guide discussion, help to clarify questions, and keep the group on-task.

   Student D will review and prioritise/organise ideas.

2. Each group shares and contributes to a follow-up discussion.

Material 2: Extension Activity – *Vaccination around the World*

Figure 1: Vaccination

How relevant is Ethics and Childhood Vaccination worldwide? What examples of existing policies around the world can you give?

1. Do online research in order to find two examples of existing vaccination ethics and childhood policies. You may choose to look for local, national or international policies. (Please feel free to use the links provided, or any others you may already know about, in order to conduct research.)
2. Once you have found the two examples, discuss the relevance of the policies found in your group. Consider the following questions: Are there differences or similarities between the examples found. What are, if any, the ethical questions raised? What is your opinion?
3. Use the following table to organize your findings:

	Origin of policy. Where?	**similarities and / or differences**	**ethical questions**	**your opinion**
example:	COVID-19 in Austria	Adult only vaccination is mandated	What about teenagers? They also carry the disease.	In my opinion ...
policy 1				
policy 2				

Useful Websites

- https://www.niehs.nih.gov/research/resources/bioethics/glossary/index.cfm
- https://health.ec.europa.eu/vaccination/overview_en
- https://health.ec.europa.eu/publications/state-vaccine-confidence-eu-2022_en
- https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2022)729309
- https://www.canada.ca/en/government/publicservice/covid-19/vaccination-public-service.html
- https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=32694
- https://www.cdc.gov/coronavirus/2019-ncov/travelers/international-travel-during-covid19.html
- https://main.mohfw.gov.in/sites/default/files/108481119000.pdf

Material 3: Variation Activity – *Vaccination and Our Rights*

Figure 1: Human rights

Consider the following quote.

Students can share their thoughts in a class discussion, orally in small groups, or in writing in a Moodle created for this purpose; thus allowing further discussion of the topic and a use of the appropriate language that the students have acquired thus far.

> "Parents perceive mandatory vaccination as an infringement of their rights."
>
> —— Smith, L. S., Hodson, A., Rubin, G. J. (2021)

Reference List

Smith, L. S., Hodson, A., Rubin, G. J. (2021). Parental Attitudes towards Mandatory Vaccination. A Systematic Review. *Vaccine* 39 (30), 4046–4053. Retrieved March 9, 2023, from https://doi.org/10.1016/j.vaccine.2021.06.018

Material 4: Worksheet – *Vocabulary Assessment*

Please select ten words from the list below and write a story using the ten words.

1. abuse
2. acceptance
3. accountability
4. agent
5. assault and battery
6. acceptance
7. benefit
8. bias
9. clinical trial
10. competence
11. compliance
12. confidentiality
13. consent
14. consideration
15. contract (v)
16. contract (n)
17. data
18. defamation
19. ethics
20. fear
21. freedom (religious, personal, social)
22. human research participants
23. imprisonment
24. invasion of privacy
25. legal and social implications (*glocal*)
26. malpractice
27. negligence
28. non-human research participants
29. offer
30. privacy

Material 5: Worksheet – *Vaccination, a Social Responsibility?*

Please read the selected parts of the article, *Voluntary COVID-19 Vaccination of Children: A Social Responsibility* by Margherita Brusa and Yechiel Michael Barilan, carefully. If needed, look up any unfamiliar vocabulary. Alternatively, you may click on the following link, for access to the entire article: Voluntary COVID-19 Vaccination of Children: A Social Responsibility.

Voluntary COVID-19 Vaccination of Children: A Social Responsibility

Introduction

The worldwide responses to the COVID-19 pandemic – travel restrictions and social distancing – originated in the Middle Ages, neither validated nor standardised by controlled trials. Actual measures have varied at the state and *communal* levels, being adjusted on a trial-and-error basis, bringing diverse measures of success. Numerous clinical trials with drugs and other therapeutic modalities have been disappointing. The first evidence-based intervention against COVID-19 is the vaccines recently approved. Even though many questions about long-term safety and efficacy are open, the evidence in hand is robust. With every day passing, the number of people vaccinated is growing, nearing 400 million. No alarming adverse effects have been announced from a retrospective study encompassing over a million adults and from 600 children aged 12–16 who received the vaccine on compassionate care basis. While clinical trials on adolescents are going on, Canada, USA and Israel have authorised the vaccine for adolescents over twelve years old.

COVID-19 has affected children much less severely than adults. However, the rate of infected children and their absolute numbers seem to be increasing. About one in three children hospitalised with COVID-19 needs intensive care. Children older than twelve are at higher risk than younger children for fatal COVID-19 disease. Some experts recommend 'off-label' vaccination of children in this age group who are considered 'high-risk' (e.g., Down Syndrome and Cerebral Palsy). When they get sick, children suffer from longer illness and more long-lasting symptoms and syndromes. This information was not known when the vaccine trials started. There is a higher regulatory threshold for safety data before children are exposed to new biological products. Consequently, children were not included in the vaccine clinical trials that led to their emergency approvals. Thus, our common desire to protect children has brought us to the situation in which the only effective measure against COVID-19 is out of their reach.

Even though experts question whether school closures and other mitigation strategies are necessary, children all over the world pay a high price in terms of mental health, education and socialisation. The COVID-19 school closures that have affected over a billion children, pose an imminent threat to child health and well-being, particularly for those living in poverty. Paradoxically, we rely on low-quality of evidence when harming children by school deprivation and social distancing, while we insist on a remarkably high level of safety data to benefit them with vaccination.

In this article, we present an argument in favour of the inclusion of children in the vaccination programmes and delineate an ethical way of doing so gradually. Perhaps, clinical trials on children will bring vaccine approval soon. However, the argument is worth considering,

especially for future crises. This is a theoretical paper in ethics that takes the Pfizer vaccine as a stock example, avoiding comparative discussion of possible differences among vaccines.

The argument for the vaccination of children

Contemporary childhood vaccines have been developed in circumstances of small eruptions and overall low rate of disease incidence. The harm-benefit balance has been divided into 'direct' versus 'indirect'. Direct benefits are reductions in morbidity and mortality from the disease; indirect benefits include protection of others by reducing spread. Reduction of overall stress and economic damage may be considered indirect benefits too. Vaccine regulation and clinical trials have focused on direct benefits and harms. We contend that the circumstances of the COVID-19 pandemic compel us to consider school closures, social distancing, and the economic toll on families as direct burdens on children.

Section 351 of the 1944 US PHS Act, and the WHO's Guideline for the Clinical Evaluation of Vaccines (last version 2017), whose standards have been adopted by the EU and numerous other countries, share the paradigm according to which vaccine safety is a balance between medical risks from a disease and medical risks from the vaccine. Section 564 of the Federal Food, Drug and Cosmetic Act, which is the legal source for the Emergency Use Authorization, allows the regulator to consider national security in the dissemination of vaccines and other therapeutics.

In the circumstances of the pandemic, a worrying gap has opened between harm-benefit-assessment of a vaccine by expert bodies, and the best interest of the child as a holistic value encompassing physical, psychological, social, and spiritual well-being. Expert panels are capable of delineating 'red lines', warning the public from specific dangers and of estimating risks. When diverse and incommensurable risks are at play, and the medical risk is vague and low, there is no scientific method for evaluating the best interest of the child. Even if this was possible epistemologically, the law compels the regulators to focus on direct bene- fits and harms only. Yet, the pandemic compels choice between tough alternatives. People are forced to choose between the medical risk–benefit of vaccines, and the medical, psychological, and social risks of containment measures. We do not argue for an alternative reading of the WHO guidelines and existing laws, but for a complementary conceptualization of 'harm/benefit' in times of crises. Precisely because the law does not invest the USA Food and Drug Administration (FDA), and similar regulatory bodies with the responsibility for monitoring the harms of containment, children's access to the COVID-19 vaccine should be a matter of public policy. Furthermore, when public policy cannot help but harming children, the public has a moral duty to empower children in relation to this harm.

The initial response to the COVID-19 pandemic was harsh and blunt. It was a novel emergency about which we knew little, and no treatment existed. A year later, the emergency has evolved into a new routine; vaccines are available. The harms to children from the pandemic and the harms visited on them by measures of containment call for re-evaluation, especially in relation to social distancing, whose harm to children is universal (all children are affected) and cumulative (the longer schools are closed, the more harm accrues). Children's daily life under restrictions is not a new stable state, but a snowball that might be accelerating beyond control. These issues loom large over the future of the next generation. They will also have to defray the debts we incur while fending the pandemic off.

Research emerging from the year of the pandemic indicates that children and adolescents are at a higher risk than adults to suffer from anxiety and depression. One report from London, describes a 10 times fold rise in abusive head trauma during the lockdown. Suicide ideations and attempts have increased in correlation with COVID-19 stressors. Such publications should set off alarms as much as vaccine safety events would shock the world. Past issues and present worries about vaccine safety need be incorporated in a broader, more holistic approach to children's protection.

In this light, focus on potential biological harms of both disease and vaccines is too narrow. Medical expertise is necessary to validate data on morbidity, mortality, and vaccine safety. It is also necessary for providing a theoretical framework for reflection on vaccine risks (Russo-Williamson adaptation of the Brad-Hill Hypothesis). All vaccines currently in use are given to babies and children, with an excellent safety profile. Validated concerns about vaccines stemmed from failures in vaccine purity, rather than biological side effects. Product purity does not seem to be an issue in contemporary well-regulated pharmaceuticals.

The new COVID-19 vaccines rely on a novel technology that does not exist in other vaccines. There is no empirical knowledge about the technology's long-term effects. Specific concerns are about triggering Multisystem Inflammatory Syndrome in Children, which is also a rare complication of COVID-19 infection. Anaphylaxis is an immediate, extreme and potentially fatal allergic reaction, which may occur following exposure to any food and drug. Such concerns should be openly communicated to the public and discussed with parents and mature children.

Imposition of social distancing might be acceptable because children can infect others; vaccination promises to benefit children by reducing or even eliminating the risk of serious disease, and by rendering them much less harmful to others. Coping measures that do not pose risk to others, such as vaccination, must be left to the individuals involved. Proper paediatric informed consent should be carried out as in any other medical procedure offered to minors.

Considering the strong, yet incomplete safety and efficacy data in hand, we conclude that as long as children are harmed by containment measures, the vaccines should be available to minors. The ultimate decision requires integration of incommensurable factors—medical, social, psychological and personal. In such circumstances, decision is a matter of individual informed consent within a regulatory framework of scientifically informed public policy.

Brusa M, & Barilan Y. M. (2021). Voluntary COVID-19 Vaccination of Children: A Social Responsibility. *J Med Ethics* 47, pp. 543–546. Retrieved March 9, 2023, from https://doi.org/10.1136/medethics-2021-107370 543

Material 6: Worksheet – *Understanding Social Responsibility*

Please answer questions 1–4 in the space provided according to the information given in the article.

1. Select a, b, or c. _____

In the sentence below, an alternative word for ***communal*** is

*Actual measures have varied at the state and **communal** levels, being adjusted on a trial-and-error basis, bringing diverse measures of success.* Read introduction section, line 3.

a) united

b) community

c) collective

2. True or false?

T/F _____ In the introduction section, the authors claim that Canada, the USA, and Israel only approved the use of the vaccine for adolescents over 12 years old, after completing clinical trials.

3. Select a, b, or c. _____

In the following sentence, which one of the words below best replaces the word ***paradoxically***?

Paradoxically, *we rely on low-quality of evidence when harming children by school deprivation and social distancing, while we insist on a remarkably high level of safety data to benefit them with vaccination.* (Read introduction section, paragraph 3):

a) mistakenly

b) ironically

c) understandably

4. Select a, b, or c. _____

According to the authors, which one of the benefits listed below is NOT an indirect benefit? (Read the section entitled, *The argument for the vaccination of children)*.

a) lower stress levels

b) protection of others

c) decreased mortality rates

Material 7: Worksheet – *Mandatory or Voluntary? You Decide!*

Answer the following prompt below in an essay (250–300 words):

Considering the existing scientific knowledge, COVID-19 vaccination should be mandatory in children. To what extent do you agree?

You should

- consider the words and ideas in the prompt
- make sure you fully answer the prompt by addressing all parts
- give a clear opinion
- use examples to support and justify your opinion.

You will be graded on the following:

- Your ability to fully and adequately answer the question. Have I fully answered the question asked?
- Coherence and cohesion of your essay. Does my writing make sense and are my ideas well organised?
- Vocabulary. Have I used appropriate academic vocabulary?
- Grammar. Have I re-read my writing to ensure the use of correct grammatical structures?

Material 8: Discussion – Bioengineering: What Comes to Mind?

Share your thoughts and ideas of what Bioengineering may entail.

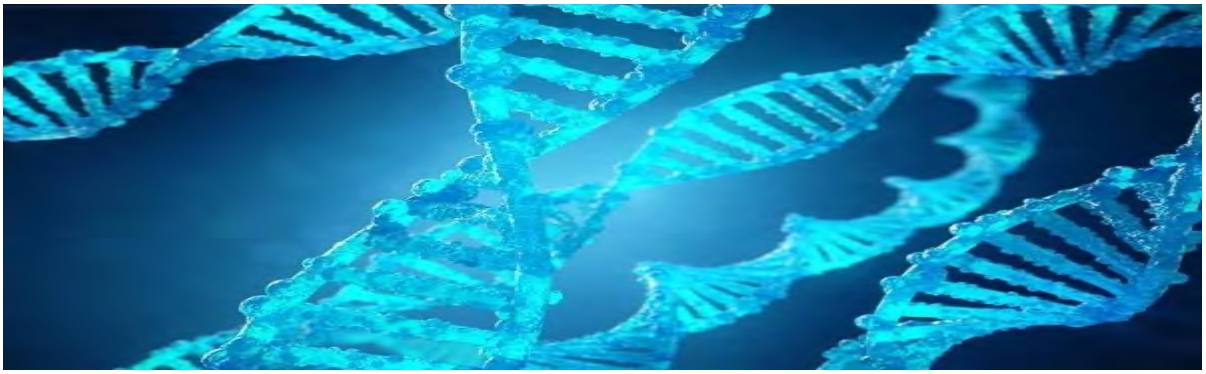

Figure 1: Bioengineering

BIOENGINEERING

Material 9: Worksheet – *What is Bioengineering?*

The following text from Berkeley Bioengineering offers a definition of bioengineering and its mains features and student training. Read it carefully and complete sentences (1–4) with the correct content (a–d).

Bioengineering is **(1)** to biological systems and biomedical technologies. Examples of bioengineering research include **(2)**, portable disease diagnostic devices, and tissue engineered organs.

Students in bioengineering are trained in **(3)**, which may include elements of electrical and mechanical engineering, computer science, materials science, chemistry, and biology. This breadth allows students and faculty to **(4)** in allied fields.

Graduates go on to successful careers in academia, medicine and a wide variety of industries.

a. fundamentals of both biology and engineering

b. a discipline that applies engineering principles of design and analysis

c. specialize in their areas of interest and collaborate widely with researchers

d. bacteria engineered to produce chemicals, new medical imaging technology

Material 10: Video – *TED Talk: Every 6-year-old Needs to Learn Bioengineering*

1. Watch the video.
2. Identify each of the video's sections (1–8).

Section 1: _____

Section 2: _____

Section 3: _____

Section 4: _____

Section 5: _____

Section 6: _____

Section 7: _____

Section 8: _____

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Material 11: Video – *The Dark Side of Genetic Engineering (Ft. Everything Science*)

1. Rewatch the first video on Bioengineering.
2. Watch the video on the perils of Bioengineering.
3. Produce a text (about 400 words) stating the advantages and disadvantages of Bioengineering.
    - Essays will be marked based on content, coherence and cohesion, lexical resource and grammatical accuracy.
    - Structure is key. Make sure to include an introduction to the topic, develop main ideas in separate paragraphs and offer a conclusion with the main findings.
4. Arguments may include but are not limited to Bioengineering's connection to ethics, 21st-century education, gender and ethnic equality, and interdisciplinarity.

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Figure 1 (upper left): Freepik (n.d.). *Female Patient with Medical Mask Getting a Vaccine* [Photograph]. Freepik.com. https://www.freepik.com/free-photo/female-patient-with-medical-mask-getting-vaccine_15595275.htm#query=vaccination&position=24&from_view=search&track=sph"

Figure 2 (middle): DCStudio (n.d.). *Biologist Researcher Holding Blood Test Tube Analyzing DNA Medical Expertise* [Photograph]. Freepik.com. https://www.freepik.com/free-photo/biologist-researcher-holding-blood-test-tube-analyzing-dna-medical-expertise_18374108.htm#query=biomedical%20science&position=4&from_view=keyword

Figure 3 (upper right): Freepik (n.d.). *Covid Still Life with Vaccine* [Photograph]. Freepik.com. https://www.freepik.com/free-photo/covid-still-life-with-vaccine_17804984.htm#page=2&query=vaccination%20ethics&position=6&from_view=search&track=ais

Figure 4 (lower left): Freepik (n.d.). *Front View Blurry Doctor with Mask Holding Vial* [Photograph]. Freepik.com. https://www.freepik.com/free-photo/front-view-blurry-doctor-with-mask-holding-vial_28266679.htm#page=2&query=vaccination&position=18&from_view=search&track=sph"

Figure 5 (lower right): Freepik (n.d.). *Close-up Little Boy Getting Vaccine* [Photograph]. Freepik.com. https://www.freepik.com/free-photo/close-up-little-boy-getting-vaccine_12689796.htm#page=2&query=vaccination&position=6&from_view=search&track=sph"

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2.5 Geography

The Tesla 'Gigafactory' in Grünheide, Germany – An Economic Success at the Cost of an Ecological Disaster?

This module focuses on the notion of sustainability as a multifaceted concept which plays an important role in the field of Human Geography. The topic of this module is the controversial project pursued by the car manufacturing company Tesla to build a large-capacity factory for the manufacturing of electric vehicles in Grünheide, Germany, a rural town situated just outside the country's capital, Berlin.

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2.5.1 Introduction

What is this Module About?

The module is situated in the field of Human Geography and highlights sustainability as one of the discipline's important orientations when relating to the impact of human activity and behaviour on environmental, social, political, and economic ecosystems.

In this module, students will critically investigate the social, economic, and ecological effects of the construction and operating of the Tesla factory in the small community town of Grünheide near Berlin, the capital of Germany. By engaging with this topic in the way proposed in this module, students will be able to acquire and expand competencies that allow for active participation in political debate and decision making, critical thinking and transfer of knowledge.

Climate change and its consequences have been recognised at an international level as one of the most urgent global challenges to be faced by humankind; and this will remain the case for decades to come. Concrete solutions, whatever they may be, normally start at the lower levels (such as the grass-roots level) and can be up-scaled should they prove to be successful and effective. Moving away from fossil fuels towards electricity powered mobility is an example of one such solution. It is still too early to make a final judgement whether electric driving will represent a substantial contribution to achieving the goal of zero-emissions and CO_2 neutrality in individual transport. However, new enterprises and companies investing in e-mobility are thriving. One such enterprise is the Elon Musk owned electric car maker Tesla which has invested large sums into building a new manufacturing site near Berlin, with the promise of becoming a major employer in the region. During the process of building the factory, various groupings began to voice their concerns over the potential negative implications of the 'gigafactory' for the environment. Looking at the issue through the multi-faceted lens provided by the notion of sustainability will foreground the glocality addressed in this TE-Con3 module.

Students engaging with the topic through the module will be asked to prepare a Panel Show performance at the end of the module. The Panel Show format implies that learners appear in the roles of stakeholders from the areas of business, politics, and the local community. They engage in spontaneous discussion and interaction in their previously developed roles. The four units of the module will guide students carefully through a succession of specially designed activities, each supporting students in their progression towards the final Panel Show event. The module presents a comprehensive language learning task which puts the critical exploration of a real-world problem centre stage.

The pedagogy pursued in this module is orientated towards a drama-based approach and the principle of action orientation. It supports HE language learners in becoming more confident foreign language users and competent communicators, while also strengthening group-identification and encouraging collaborative problem-solving. Relevant content-knowledge as well as communicative, interactional, and performative skills is both addressed and developed.

Module Structure and Implementation

In mapping learning progression on a task-based structure (pre task, task cycle, target task, and evaluation), this module consists of four units of approx. 90 minutes each. The opening unit which introduces the module, the teaching and learning aims, and a preview of the final

product is followed by two units which focus on exploring content and language as well as on skills for collaboration and fluency. Units 1 to 3 prepare students for the final one, in which a Panel Show will be put on stage about the Tesla factory project with regard to sustainability. In a closing reflection phase, students can evaluate their learning process in terms of language development, content knowledge and understanding, and the growth of their social skills.

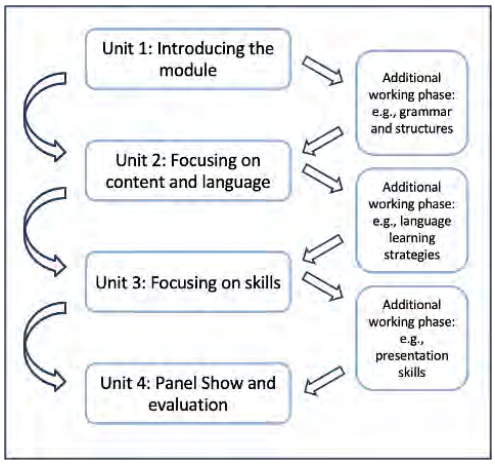


Figure 1: Two ways to work with the module

The module can be taught in a compact succession of four sessions; or, depending on the specific learning needs of a group, as a longer-term project which may be punctuated by phases of intensified work, e.g., on grammar and structures, pragmatics, or language learning strategies and techniques, and on performance / presentation skills. The teaching guidelines provided give suggestions for time management in each unit. Adaptations may need to be made depend-ing on the teaching context, in particular if the students are not very familiar with interactive games and drama pedagogy.

The module has been designed to be taught mostly on site. However, some activities also include individual revision or practice that are suited for online and / or self-study.

Specific learning goals for each unit are listed in the teaching guidelines below. Straightforward assessment sheets are provided for each unit. At the end of the module, teachers can use the module assessment sheet to also evaluate students' individual progress. After finishing Unit 4, students may be invited to use the self-assessment sheet to reflect on their own learning process.

Language Level and Scaffolding Options

The module is suitable for language levels B2–C1. Scaffolding is provided to mediate the accessibility of the materials without compromising the quality of student engagement. In response to the premises of language sensitivity and culture-orientation, reading texts are provided in both the original version (standard) and a scaffolded version, designated by the label "sources+". Games and other activities can be implemented at different levels of linguistic and difficulty and demands for social and performative skills.

The teaching guidelines below provide details of how to work with the module and how to use the assessment sheets. The "Student Materials" section contains all relevant resources in order of appearance in every unit.

2.5.2 Teaching Materials Geography

Unit 1: Teaching Guidelines

Topic: introducing the module

Level: B2–C1

Skills: speaking, reading, listening

Timing: ~ 90 min. of study

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. develop an emergent understanding of Geography as an academic discipline. ✓ Ss. can express their initial reactions to and opinions about the new Tesla factory. ✓ Ss. can express spontaneous thoughts in an informal setting.	✓ Ss. begin to problematise the Tesla factory with regard to sustainability. ✓ Ss. can summarise the theoretical background of the various dimensions of sustainability.	✓ Ss. make use of their social skills to facilitate peer-to-peer interaction and collaboration.

Assessment: For this unit, there is a student assessment sheet available for teachers. This way, teachers can assess whether the intended learning outcomes have been reached by the students and decide if additional support is needed.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. warm-up	~ 30 min	pair work / group work
2. introducing the topic	~ 15 min	classroom discussion
3. introducing the goal of the module	~ 15 min	classroom discussion
4. introducing a key concept	~ 30 min	pair work / group work; individual work

Materials

- Material 1: Task Description – *Drama Games*
- Material 2: Video – *Elon Musk Opens Controversial Tesla Factory near Berlin*
- Material 3: Task Description – *Panel Show*
- Material 4: Role Cards – *Panel Show*
- Material 5: Word Box – *Personal Qualities for the Panel Show*
- Material 6: Video – *How to Moderate a Panel Discussion*
- Material 7: Worksheet – *Sustainability*

STAGE 1 – WARM–UP

Objectives

content objectives	language objectives	culture objectives
–	✓ to activate and encourage fluency, spontaneity, and communicate creativity	✓ interaction with other Ss. ✓ development of social skills

Suggested Procedure

1. Students start with the drama game “Trios” (Material 1). At this stage, they play this game with general topics of free choice.
2. As a follow-up game, students play “Just a Minute”. Depending on how much time there is left, students may also continue with the drama game “Press Conference” (Material 1).
3. The teacher monitors the activities, provides language support, and notes down language points later to be revised with the entire class.

Materials

- Material 1: Task Description – *Drama Games*

STAGE 2 – INTRODUCING THE TOPIC

Objectives

content objectives	language objectives	culture objectives
✓ to learn about the construction and operation of the Tesla factory in Grünheide, Brandenburg	✓ to articulate spontaneous thoughts and initial reactions	✓ to become aware of the multifaceted discourse surrounding the new Tesla factory

Suggested Procedure

1. Students watch a short video about the Tesla factory (Material 2).
2. They share first thoughts and initial reactions with the whole class.

Materials

- Material 2: Video – *Elon Musk Opens Controversial Tesla Factory near Berlin*

STAGE 3 – INTRODUCING THE GOAL OF THE MODULE

Objectives

content objectives	language objectives	culture objectives
✓ to learn about the goals of the module	–	✓ to establish transparency regarding requirements of the module

Suggested Procedure

1. The teacher explains that at the end of the module students will be required to organise a Panel Show discussing the Tesla factory with regard to sustainability.
2. The teacher hands out the task description of the Panel Show, the role cards, and the list of personal qualities in order to illustrate the final product of the module (Materials 3, 4, 5).
3. Additionally, students watch an instruction video that explains what a Panel Show is and what it requires of students (Material 6).

Teacher's Notes

From the beginning, the goal of the module should be made transparent to the students. At the end of the module (Unit 4), students will stage a Panel Show discussing the Tesla factory's sustainability. By performing this task, students will show the knowledge and skills that they have acquired and honed during the course of the module. It is also an opportunity to display a range of opposing or conflicting points of view on a certain topic; and while also looking to achieve common ground. Therefore, students will demonstrate their content knowledge and their understanding of a topic. Simultaneously, the module looks to encourage skills such as argument building and understanding, as well as analytical reasoning (Playing beyond CLIL 2021, pp. 12, 21). Importantly, it also addresses one TE-Con3's central premises, that of promoting empathy and democratic citizenship education, by engaging students in a role-play.

Materials

- Material 3: Task Description – *Panel Show*
- Material 4: Role Cards – *Panel Show*
- Material 5: Word Box – *Personal Qualities for the Panel Show*
- Material 6: Video – *How to Moderate a Panel Discussion*

STAGE 4 – INTRODUCING A KEY CONCEPT

Objectives

content objectives	language objectives	culture objectives
✓ to learn about the theoretical background of sustainability as a key concept of geography	✓ to understand theoretical information and to sum up most important aspects	✓ to negotiate the relation between dimensions of sustainability

Suggested Procedure

1. Students create a mind map by collecting first thoughts about the concept of sustainability.
2. A worksheet introduces students to the theoretical background of the spheres of sustainability (Material 7).
3. Finally, students restructure the mind map from step one, and compare their first associations about the topic with what they will have gathered from the theoretical input.

Materials

- Material 7: Worksheet – *Sustainability*

Unit 1: Assessment Sheet

Course: Date:

Tick the boxes that apply after teaching this unit and note down comments.

TO KNOW	TO VALUE	TO ACT
A. multidisciplinary B. content-driven C. language-sensitive	D. culture-oriented E. glocal F. academic	G. task-based H. modular I. interactive & performative
☐ Students develop an emergent understanding of Geography as an academic discipline. ☐ Students can express their initial reactions to and opinions about the new Tesla factory. ☐ Students can express spontaneous thoughts in an informal setting.	☐ Students begin to problematise the Tesla factory project with regard to sustainability. ☐ Students can summarise the theoretical background of the various dimensions of sustainability.	☐ Students make use of their social skills to facilitate peer-to-peer interaction and collaboration.

My comments:

Unit 2: Teaching Guidelines

Topic: focusing on content and language

Level: B2–C1

Skills: speaking, reading

Timing: ~ 90 min. of study

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. gather relevant information from authentic materials. ✓ Ss. can summarise aspects of the controversy about the Tesla factory regarding sustainability. ✓ Ss. can identify, understand, and use the subject-specific language of Geography.	✓ Ss. can link different aspects of the general concept of sustainability to the effects of the Tesla factory as a local issue. ✓ Ss. understand the complexity of the controversy surrounding the Tesla factory as a multifaceted issue. ✓ Ss. problematise the construction and operation of the Tesla factory.	✓ Ss. can organise group work, communicate with their partners, and gather information collaboratively. ✓ Ss. can effectively share their findings with their peers.

Assessment: For this unit, there is a student assessment sheet available for teachers. This way, teachers can assess whether the intended learning outcomes have been reached by the students and decide if additional support is needed.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. research phase	~ 60 min	group work
2. presentation phase	~ 30 min	group work

Materials

- Material 1: Task Description – *Drama Games*
- Material 2: Video – *Elon Musk Opens Controversial Tesla Factory near Berlin*
- Material 8: Worksheet – *Expressions for Working in Groups*
- Material 9: Handout – *Research Questions*
- Material 10: Texts – *Sources 1–6*
- Material 11: Texts – *Sources+ 1–6*
- Material 12: Glossary – *Geographical Terms*

STAGE 1 – RESEARCH PHASE

Objectives

content objectives	language objectives	culture objectives
✓ to deepen content knowledge about the effects of the Tesla factory	✓ to learn content-specific vocabulary ✓ to learn expressions useful for working in small groups	✓ to organise group work and come to a joint conclusion

Suggested Procedure

1. This unit requires that students work in groups. As an optional preparatory measure to build the necessary linguistic skills, you could provide expressions that are useful when working in groups (Material 8). Students first study the phrases on page A of the worksheet and then do the sorting exercise on page B. More advanced students may start with page B and only look at the list of expressions afterwards.
2. Divide the class into smaller groups and assign research questions (Material 9) or one of the dimensions of sustainability to each group. Students study several texts and other sources that examine the social, environmental, and economic effects of the Tesla 'giga-factory' (Materials 2, 10 / 11). After summarising the information and answering the research questions, students prepare a presentation.

3. To complete the research phase and get ready for the presentation of their results, students play “Just a Minute” within their group in order to apply their new knowledge, activate their speaking skills, and practice fluency (Material 1).

Scaffolding Options

Not all texts and sources are relevant to every group. Teachers may pre-sort the materials and assign them to the groups beforehand. Please note that the reading questions at the end of each text help students to determine relevance of a text for their topic. Each text is presented in a standard version (Material 10) and a scaffolding+ version (Material 11). In addition to the reading questions, the scaffolding+ version of each text includes paragraph references helping students to find the relevant information in the text.

The glossary of geographical terms provides students with explanations of key-terms and vocabulary that come up in the sources (Material 12).

Extension / Variation

Depending on the time available, groups may prepare a poster to present their results.

Materials

- Material 1: Task Description – *Drama Games*
- Material 2: Video – *Elon Musk Opens Controversial Tesla Factory near Berlin*
- Material 8: Worksheet – *Expressions for Working in Groups*
- Material 9: Handout – *Research Questions*
- Material 10: Texts – *Sources 1–6*
- Material 11: Texts – *Sources+ 1–6*
- Material 12: Glossary – *Geographical Terms*

Answers

Material 8: Worksheet – *Expressions for Working in Groups*

The text explains (that) …	*describing and reporting*
Sorry, I don’t follow. Could you explain that again, please?	*not understanding sth.*
The main idea of the text is …	*describing and reporting*
The study suggest (that) …	*describing and reporting*
Sorry, what I meant to say was …	*clarifying*
According to the text …	*describing and reporting*
In other words, …	*clarifying*
Could I ask a question, please?	*getting into the conversation*

Could you explain that again, please?	*clarifying*
The article highlights …	*describing and reporting*
I didn't understand what you said about …	*not understanding sth.*
What did you mean by saying …?	*clarifying*
The author doubts (that) …	*describing and reporting*
I'd like to make a comment here.	*getting into the conversation*

STAGE 2 – PRESENTATION PHASE

Objectives

content objectives	language objectives	culture objectives
✓ to develop an understanding of the relation between different stances concerning the Tesla factory	✓ to present findings to other Ss.	–

Suggested Procedure

In this phase, students come together in new groups, consisting of at least one member of each of the previous groups. In turns, they present their findings from the research phase to each other.

Extension / Variation

In courses with more advanced students, presentations may include more challenges, such as setting a time limit of one minute for each person speaking. In a less demanding version, no new groups are formed, and the original groups present their findings together taking turns, but each person is only allowed to say one sentence at a time.

Unit 2: Assessment Sheet

Course: Date:

Tick the boxes that apply after teaching this unit and note down comments.

TO KNOW	TO VALUE	TO ACT
A. multidisciplinary B. content-driven C. language-sensitive	D. culture-oriented E. glocal F. academic	G. task-based H. modular I. interactive & performative
☐ Students gather relevant information from authentic materials. ☐ Students can summarise aspects of the controversy about the Tesla factory regarding sustainability. ☐ Students can identify, understand, and use the subject-specific language of Geography.	☐ Students can link different aspects of the general concept of sustainability to the effects of the Tesla factory as a local issue. ☐ Students understand the complexity of the controversy surrounding the Tesla factory as a multifaceted issue. ☐ Students problematise the construction and operation of the Tesla factory.	☐ Students can organise group work, communicate with their partners, and gather information collaboratively. ☐ Students can effectively share their findings with their peers.

My comments:

Unit 3: Teaching Guidelines

Topic: focusing on skills

Level: B2–C1

Skills: speaking

Timing: ~ 90 min. of study

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. can define and use important geographical terms. ✓ Ss. can use common phrases for discussions.	✓ Ss. can critically evaluate arguments.	✓ Ss. can talk spontaneously about a given topic. ✓ Ss. interact spontaneously with interlocutors.

Assessment: For this unit, there is a student assessment sheet available for teachers. This way, teachers can assess whether the intended learning outcomes have been reached by the students and decide if additional support is needed.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. revision of vocabulary	~ 10 min	individual work
2. argumentation types	~ 20 min	individual work
3. speaking skills	~ 15 min	individual work; group work
4. preparation for Panel Show	~ 45 min	group work

Materials

- Material 1: Task Description – *Drama Games*
- Material 3: Task Description – *Panel Show*
- Material 4: Role Cards – *Panel Show*
- Material 5: Word Box – *Personal Qualities for the Panel Show*
- Material 12: Glossary – *Geographical Terms*
- Material 13: Worksheet – *Geographical Terms*
- Material 14: Worksheet – *Argumentation Types*
- Material 15: Worksheet – *Discussion Phrases*
- Material 16: Word Box – *Just a Minute*

STAGE 1 – REVISION OF VOCABULARY

Objectives

content objectives	language objectives	culture objectives
–	✓ to activate useful vocabulary for the Panel Show	–

Suggested Procedure

1. Students revise useful vocabulary of the geographical glossary either by matching terms and definitions or filling in a crossword puzzle. Both activities can also be done consecutively (Material 12, 13).
2. Additionally, students may play “30 Seconds” with geographical terms (Material 1).

Materials

- Material 1: Task Description – *Drama Games*
- Material 12: Glossary – *Geographical Terms*
- Material 13: Worksheet – *Geographical Terms*

Answers

Material 13: Worksheet – *Geographical Terms*

1) 1i, 2d, 3h, 4a, 5f, 6j, 7c, 8b, 9g, 10e

2) 1 drought, 2 infrastructure, 3 vulnerability, 4 water scarcity, 5 contamination,
6 deforestation, 7 groundwater, 8 urbanisation, 9 habitat, 10 biodiversity, 11 climate change,
12 environment, 13 pollution, 14 ecosystem, solution: sustainability

STAGE 2 – ARGUMENTATION TYPES

Objectives

content objectives	language objectives	culture objectives
✓ to use content-knowledge to build an argument	✓ to build valid arguments	✓ to evaluate different types of arguments

Suggested Procedure

Students work on a worksheet that provides input about different types of arguments and about how to critically evaluate such arguments (Material 14).

Materials

- Material 14: Worksheet – *Argumentation Types*

Answers

Material 14: Worksheet – *Argumentation Types*

1) 1d, 2c, 3b, 4e, 5a

2) a. This is an illogical statement. Teslas are a sub-set of electric cars.

b. The statement uses emotional language instead of a reasoned argument.

c. The question is a distraction from the original issue. It does not attack the disputant's statement. This is also called "whataboutism" and can be classified as a variant of the *tu quoque* argument.

d. This cause and effect relationship needs to be supported by further evidence. The statement could be true, but there could also be other explanations for the alleged correlation. Correlation does not mean causation.

STAGE 3 – SPEAKING SKILLS

Objectives

content objectives	language objectives	culture objectives
✓ to revise topic-related concepts	✓ to learn useful phrases for discussions ✓ to speak freely about concepts related to the topic of the module and to foster fluency	✓ to apply phrases and rhetorical expressions critically and fairly

Suggested Procedure

1. The worksheet with rhetorical expressions offers phrases that are useful in discussions. Students may demonstrate an understanding of these expressions by completing a matching exercise (Material 15). They first study the phrases on page A of the worksheet and then do the sorting exercise on page B. Students with a more advanced language level may start with page B and only look at the list of expressions afterwards.
2. Actively using rhetorical expressions for discussions can be practiced while playing drama games. For a game of "Just a Minute", words from the word box will be chosen. They prompt students to talk about terms that are related to geography. Students' performance skills are further enhanced by the game "The Good, the Bad and the Ugly Advice" (Materials 1, 16).

Materials

- Material 1: Task Description – *Drama Games*
- Material 15: Worksheet – *Discussion Phrases*
- Material 16: Word Box – *Just a Minute*

Answers

Material 15: Worksheet – *Discussion Phrases*

I entirely disagree with your statement.	*disagreeing*
I'm convinced (that) …	*giving your opinion*
Referring to …	*referring to external sources*
Can you comment on that?	*asking for opinions*
On the one hand … on the other hand …	*contrasting*
Furthermore, …	*transitioning*
For instance	*giving examples*
I completely agree with what you have said.	*agreeing*
I strongly believe (that) …	*giving your opinion*
I partly agree that …	*agreeing*
To illustrate my point, …	*giving examples*
What is your opinion on …?	*asking for opinions*
Experts are convinced (that) …	*referring to external sources*
Besides that …	*transitioning*
All the factors considered, …	*concluding*
Generally speaking, …	*concluding*
I think that's debatable.	*disagreeing*

STAGE 4 – PREPARATION FOR PANEL SHOW

Objectives

content objectives	language objectives	culture objectives
✓ to revise the content of the module ✓ to summarise arguments for a particular viewpoint on the topic	✓ to revise necessary vocabulary	✓ to tune in to the respective character of the Panel Show

Suggested Procedure

1. Roles for the Panel Show are assigned to small groups of students (Material 3, 4, 5). Teachers may want to actively assign roles to the groups or allow the groups to choose freely. Alternatively, role cards can be drawn randomly by the groups.
2. From now on, students stay in the same groups. Groups will prepare "their" role for the final Panel Show discussion. They may summarise arguments for their roles, counter-arguments, revise necessary vocabulary and discussion phrases; or create fact sheets or cards that they can use in the discussion.
3. Finally, they need time to rehearse their roles. The drama games "Hot Seat" and "Vocal Mirrors" are particularly useful at this stage (Material 1). "Hot Seat" challenges students to speak and respond fluently and spontaneously. "Vocal Mirrors" supports less fluent speakers by slowing down the speed of speech.

Materials

- Material 1: Task Description – *Drama Games*
- Material 3: Task Description – *Panel Show*
- Material 4: Role Cards – *Panel Show*
- Material 5: Word Box – *Personal Qualities for the Panel Show*

Unit 3: Assessment Sheet

Course: Date:

Tick the boxes that apply after teaching this unit and note down comments.

TO KNOW	TO VALUE	TO ACT
A. multidisciplinary B. content-driven C. language-sensitive	D. culture-oriented E. glocal F. academic	G. task-based H. modular I. interactive & performative
☐ Students can define and use important geographical terms. ☐ Students can use common phrases for discussions.	☐ Students can critically evaluate arguments.	☐ Students can talk spontaneously about a given topic. ☐ Students interact spontaneously with interlocutors.

My comments:

Unit 4: Teaching Guidelines

Topic: Panel Show and evaluation

Level: B2–C1

Skills: speaking, listening

Timing: ~ 90 min. of study

Planned Learning Outcomes:

	TO KNOW	TO VALUE	TO ACT
TE-CON3 PREMISES	**A. multidisciplinary** **B. content-driven** **C. language-sensitive**	**D. culture-oriented** **E. glocal** **F. academic**	**G. task-based** **H. modular** **I. interactive & performative**
	✓ Ss. can apply content knowledge showing their understanding of the relation between the Tesla factory and sustainability. ✓ Ss. can use appropriate language to express their own stances or the opinions of the roles they are supposed to take.	✓ Ss. can negotiate the significance of social, economic, and environmental factors in discussion the Tesla factory. ✓ Ss. can demonstrate and explain the complex relations between social, economic, and environmental factors. ✓ Ss. articulate opinions based on factual knowledge (even though they are not necessarily their own).	✓ Ss. can engage in a goal-oriented discussion. ✓ Ss. can take on a role, present its respective stance, and compare it to views of others.

Assessment: For this unit, there is a student assessment sheet available for teachers. This way, teachers can assess whether the intended learning outcomes have been reached by the students and decide if additional support is needed. In addition to that, teachers may evaluate the learning process over the course of the entire module by using the module assessment sheet.

Unit Progression at a Glance:

unit stage	time	interaction patterns
1. warm-up	~ 25 min	group work
2. Panel Show	~ 45 min	group work
3. evaluation	~ 20 min	individual work; classroom discussion

Materials

- Material 1: Task Description – *Drama Games*
- Material 3: Task Description – *Panel Show*
- Material 4: Role Cards – *Panel Show*
- Material 5: Word Box – *Personal Qualities for the Panel Show*
- Material 17: Evaluation Sheet – *Self-Assessment for Students*

STAGE 1 – WARM-UP

Objectives

content objectives	language objectives	culture objectives
✓ to activate content-knowledge	✓ to activate speaking skills	–

Suggested Procedure

To warm up and activate speaking skills before the Panel Show, students may play the game "Vocal Mirrors" or "Hot Seat" in small groups (Material 1).

Materials

- Material 1: Task Description – *Drama Games*

STAGE 2 – PANEL SHOW

Objectives

content objectives	language objectives	culture objectives
✓ to display a plurality of opposing or conflicting points of view ✓ to relate positions to each other ✓ to demonstrate content knowledge and Ss.' understanding of the topic	✓ to state opinions of a given role or one's own and present arguments ✓ to respond to prompts by other interlocutors	✓ to practice role-taking and thus foster empathy as a central capacity in democratic citizenship education ✓ argument building and analytical reasoning – to critically evaluate opposing viewpoints and controversies

Suggested Procedure

1. Students engage in a Panel Show discussing whether the Tesla 'gigafactory' is an economic success at the cost of an ecological disaster. Therefore, students take on the roles of experts or people from the general public with different opinions on a particular subject and conduct a discussion in the presence of an audience (Materials 3, 4, 5).
2. The discussion is led by the host who puts forth questions and comments to elicit opinions and argumentative statements from the panelists, asks them to elaborate on points they make, or respond to statements made by other participants on the panel.

Extension / Variation

Students sometimes express the desire to leave their roles and speak "as themselves" when they are deeply involved in the topic and their personal views opposes the one they have to adopt in their roles. We think it is advisable to allow for this, however, taking care that this happens outside of the Panel Show situation. Expressing and discussing their personal attitudes and views about the topic is a valuable follow-up activity for students, one which can also strengthen their capacity to participate in democratic discourse. The task of the teachers and facilitators within such interactions is to provide linguistic scaffolding and to encourage the use of arguments whenever possible. In exceptional cases, careful and sensitive moderation may be necessary.

Materials

- Material 3: Task Description – *Panel Show*
- Material 4: Role Cards – *Panel Show*
- Material 5: Word Box – *Personal Qualities for the Panel Show*

STAGE 3 – EVALUATION

Objectives

content objectives	language objectives	culture objectives
✓ to recapitulate and sum up what has been learned about sustainability	✓ to state an opinion and to provide evaluative feedback	✓ to make students' individual learning progress transparent ✓ to promote learners' autonomy by allowing to set individual goals

Suggested Procedure

To finish this unit and the module as a whole, students reflect their learning experience and outcome (Material 17). Opportunity should be given to allow personal comments and, potentially, ideas for future language classes, topics, and activities.

Materials

- Material 17: Evaluation Sheet – *Self-Assessment for Students*

Unit 4: Assessment Sheet

Course: Date:

Tick the boxes that apply after teaching this unit and note down comments.

TO KNOW	TO VALUE	TO ACT
A. multidisciplinary B. content-driven C. language-sensitive	D. culture-oriented E. glocal F. academic	G. task-based H. modular I. interactive & performative
☐ Students can apply content knowledge showing their understanding of the relation between the Tesla factory and sustainability. ☐ Students can use appropriate language to express their own stances or the opinions of the roles they are supposed to take.	☐ Students can negotiate the significance of social, economic, and environmental factors in discussing the Tesla factory project. ☐ Students can demonstrate and explain the complex relations between social, economic, and environmental factors. ☐ Students articulate opinions based on factual knowledge (even though they are not necessarily their own).	☐ Students can engage in a goal-orientated discussion. ☐ Students can take on a role, present its respective stance, and compare it to views of others.

My comments:

Module Assessment for Teachers

Student's name: Date:

This assessment is based on each student's performance in all four units.

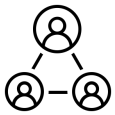
1) The student can talk spontaneously about a given topic.	1 2 3 4 5
2) The student can express their own opinion/the opinion of their role and arguments using context-appropriate language.	1 2 3 4 5
3) The student is able to react constructively to other viewpoints.	1 2 3 4 5
4) The student can relate different viewpoints to each other.	1 2 3 4 5
5) The student can use common phrases for discussions.	1 2 3 4 5
6) The student can use subject-specific language and geographical discourse meaningfully.	1 2 3 4 5
7) The student took an active part in the Panel Show.	1 2 3 4 5
8) The student fulfilled their assigned role/function in the Panel Show effectively.	1 2 3 4 5

My comments:

2.5.3 Student Materials Geography

Material 1: Task Description – *Drama Games*

Trios



Three things that are loosely connected to each other within one category need to be found in each round of this game. Students stand in a circle. One person thinks of an object, animal, or person, says what they are, mimes it, and then freezes. The second student says and mimes what they associate with it. The third student needs to think of something that is related to at least one of the two things, which they then also say and mime. Students can either play this game together with the whole class and take turns as players or in groups of three. In this case, the third player from the first round will be the first to begin the second round. This game encourages creative thinking and lets students articulate creative associations to a topic in a fun way without establishing a lot of language requirements. It will activate vocabulary. Therefore, it can also facilitate brainstorming for the topic of the module. For that purpose, students will play a few rounds of the game with general topics and then with the specific topic "sustainability".

Just a Minute

Students are asked to talk about a given subject for one minute. While speaking, they need to avoid repeating themselves, hesitating, or deviating from the topic. If they make a mistake, other players can challenge them by calling "repetition", "hesitation", or "deviation". All players decide together whether the challenge is valid. If a person makes a valid challenge, a point is assigned to them, and they are the next to speak for the remaining time or until they are also challenged. If a challenge is not valid, the incorrectly challenged speaker collects a point and can continue speaking. Whoever is speaking when the time is up receives two points. If a player manages to talk for an entire minute without being challenged, they receive five points. For starters, there may only be one requirement of the speech, for instance no deviation from the topic, and then the game can slowly become more difficult by also introducing the other challenges. "Just a minute" fosters students' ability of free and spontaneous speech as well as it asks students to listen closely.

Press Conference

One student from the group will be interviewed but doesn't know which famous person they play. This person leaves the room while the others – the journalists – decide on a role for the interviewee. In the press conference, the journalists will then pose questions that give hints who the interviewed person could be. They should really act like journalists (e.g., pretend to take notes). The interviewee needs to reply to the questions and guess who they are. The game ends when they find out who they are. In a variation of the game, the interviewed person may not only be a human being but could also be other things like objects, abstract concepts or a geographical feature. For example, the interviewed person is Berlin. Students playing the journalists could ask questions like "How many people live in you?" or "How did it feel when you were divided for almost 30 years?" This game enhances the ability to ask specific and creative questions.

The Good, the Bad, the Ugly Advice

In this game, three students are given a problem or asked a question by the class. The first student needs to think of a good advice to the problem and the second of a bad one. The third student will come up with advice to the problem that is even worse than the bad advice. In the next round, the students who gave good and bad advice now have to think of bad and ugly advice while someone new is chosen to provide a good advice. Alternatively, three new students will provide advice. Students will practice spontaneous reaction to a question in this game.

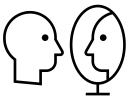
30 Seconds

In this game, two groups compete against each other. One student has thirty seconds to describe a term without using the term itself. The other team members have to guess the correct term. If they guess the term within 30 seconds, they will be given one point. Decide on a price for the team with the most points at the end of the game!

Hot Seat

One student gets into the “hot seat” and is asked various questions by the group like in an interview. The interviewed person takes on a role of another person and tries to really act like that character. This could also be the role that they will play in the Panel Show. This activity especially helps students right before the panel discussion to imagine what their character might be thinking or how they might be feeling.

Vocal Mirrors



In this game, students get together in pairs. One of each pair will be the actor and the other one the mirror. The actor is given a certain situation that they need to perform. While the actor is talking, the other person has to mirror everything the actor says at the same time. They can also add movements. Normally, students will need to reduce their speed of talking and acting. This activity fosters anticipation skills as well as fluency and security while speaking. It can also be used to practice verbalising individual arguments for the Panel Show.

Material 2: Video – *Elon Musk Opens Controversial Tesla Factory near Berlin*

1. Watch the video.
2. Talk about what this news show evokes. Share your first thoughts with the class.

DW News (2021, October 10). *Elon Musk Opens Controversial Tesla Factory near Berlin* [Video file]. Retrieved from https://youtu.be/2UVYp8mVYy4

Material 3: Task Description – *Panel Show*

"The Tesla 'Gigafactory' in Brandenburg, Germany – An Economic Success at the Cost of an Ecological Disaster?"

For this task, students will engage in a Panel Show discussing the topic "The Tesla 'gigafactory' in Brandenburg, Germany – an economic success at the cost of an ecological disaster". Students take on the roles of experts or people with different opinions on a particular subject and have a discussion in the presence of an audience. The discussion is led by a host who puts forth questions and comments to elicit opinions and argumentative statements from the panellists, asks them to elaborate on points they make, or respond to statements made by other participants on the panel.

Figure 1: Roles in a Panel Show

To begin with, decide which roles should be included in the Panel Show. The role cards offer some suggestions like a host, Elon Musk, the major of Grünheide, or an animator. Roles can be changed, some can be left out, or more can be added if required. The cards outline the function of each role, in other words, the stance they take in the discussion, i.e., in favour of the factory, supporting it under certain conditions, against it, or undecided. As an additional feature, a personal character trait is assigned. You might think of more character traits, which can add a lot of fun to the task and the Panel Show itself.

Roles are then assigned to small groups of students. The groups are asked to prepare to participate – either as a whole or through a designated representative from the group – in the Panel Show where they will speak and act as the person assigned to them on their role card. They will prepare for the Panel Show by formulating their respective position, collecting and arranging arguments, anticipating counter-arguments, and thinking of how to respond to them. Group members who don't play the role in the Panel Show itself become 'ordinary' members of the audience.

As part of the preparation, all students will write down questions and hand them over to the host, who will select some (either by pre-selection or by drawing them from a hat) for discussion during the Panel Show. Generally, the host is responsible for all interaction happening on "the stage", while an animator is responsible to engage the audience in the Panel Show. Before the show starts, the audience could be asked by an animator to vote which stance they take. This vote is repeated after the show as well to show if and how the discussion influenced the audience's opinion.

At the beginning of the Panel Show, the host welcomes her/his guests as well as the audience, briefly introduces the panellists, and then allows each to deliver a short (timed) introductory statement. The host will lead the panellists through various aspects of the debate's topic. This person may use the questions provided by the audience as she/he sees fit. As a variation, the audience can be given the chance to contribute to the discussion by asking further questions. If a question from the audience arises, the animator steps in at a suitable point and either

gives the person from the audience the chance to speak aloud or forwards the question to the panel. Each of the panellists should be given the chance to fully present his/her stance and arguments. Students should have 30–40 minutes for preparation. The Panel Show itself lasts about 45 minutes.

Further variations

Instead of the typical character traits of each role described on the role cards, participants in the Panel Show can adopt various personal qualities (some suggestions can be found in the word box). The qualities can either be chosen by the teacher or students, or they can be drawn randomly.

In a second variation, not only the character traits vary, but also the positions that the panellist advocate (i.e., for or against Tesla's factory) are assigned arbitrarily. In this scenario, an environmentalist may need to argue in favour of the factory and find creative arguments to support this stance.

A potential variation to the audiences' pre-/post vote procedure is to arrange anonymous ballots (e.g., with the help of a mailbox) before and after the Panel Show for the entire class. Comparing the results provides an opportunity for follow-up discussions where learners can share their personal opinions (or changes of opinion) stepping outside of the role they played in the Panel Show.

Material 4: Role Cards – *Panel Show*

Host

Task:

1. As the host of the panel show you moderate the discussion. First, you need to briefly introduce the panellists and explain why they were selected as guests in the show.
2. You initiate the debate by asking the panellists questions – some of which you have prepared yourself, but also those you received from the 'audience'. You should already think of which questions to ask whom of the participants before the show begins.
3. During the discussion, it is your task to ask participants to elaborate on their viewpoints or to respond to statements by other people on the panel. You may even ask some provocative questions in order to challenge the panellists' views. As the moderator, you decide when to move from one aspect of the topic to the next. You may also communicate with the Animator and ask her/him to collect questions or comments from the audience.
4. Finally, you choose when to end the discussion and thank the participants for their contribution.

Personality: Typically, the host of a panel show is confident, charming, humorous, diplomatic, and outgoing. He/She tries to evoke interest for the topic. Although you may ask provocative questions, you should maintain a neutral and fair attitude towards the panellists and their different stances while showing interest in what they have to say. It is your job to make sure that everyone present feels safe in particular if the discussion topic is controversial.

Rescue notice: If things start to go out of hand, ask your tutor/teacher to assist you.

Audience

As a member of the audience, you will take an interest in the topic whatever it is. Remember: You bought a ticket for the studio and perhaps travelled a long way after to see the show.

Task:

1. The audience makes an active contribution to the Panel Show. Before and after the discussion, you will be asked to vote which stance on the topic you take, i.e., in favour of the factory, supporting it under certain conditions, against it, or undecided.
2. During the discussion, you should think of further questions for the panellists or remarks you want to make. Signal to the animator that you want to contribute to a certain aspect of the discussion, and he/she will give you the chance to speak.
3. All members of the audience are also strongly encouraged to react to what the panellists say by applauding, laughing, or expressing disagreement.

Environmentalist

Since Tesla announced plans to build a factory in Brandenburg, the main criticism against it has issued from an environmental protection point of view. Therefore, it is crucial to have a representative of an environmental organisation contributing to the discussion.

Task:

1. As an environmentalist, you should be able to demonstrate precisely which impact the factory has on the environment and which resources are particularly endangered. Maybe you can even refer to scientific findings. Which actions do you demand Tesla or politicians to take in order to minimise environmental impact and hazards?
2. Think of which counterarguments might come up from other panellists. How can you dismiss them?

Personality: Since you see a severe threat for the environment in the ‘gigafactory’, you should appear in a serious manner. You could also express that the situation makes you angry or show how passionate you are about protecting the environment.

Elon Musk

Elon Musk, the CEO of Tesla, promotes Tesla's interests.

Task:

1. Being Elon Musk, you will, of course, argue in favour of the 'gigafactory' and defend it against critics. Therefore, you need to find reasons and arguments that support the factory in Brandenburg. You should also be prepared to give details of the planned production. You should know *a lot* and also why everything you do is a benefit for the people and the community in Grünheide, Brandenburg.
2. Think of which counterarguments might come up from other panellists. How can you dismiss them?

Personality: Elon Musk appears as a very confident person. In interviews or speeches, he often seems calm and laid-back. Watch or listen to an interview with him as part of the preparation for this role.

Mayor of Grünheide

Tesla's factory has become a political issue. Playing the mayor of Grünheide, the town near which the new 'gigafactory' is built, you take on the role of arguing which political considerations have led to the (preliminary) approval of the 'gigafactory'.

Task:

1. As a democratic representative, you need to be able to explain which interests have been weighed up against each other in the decision-making process and which advantages for the region are expected from Tesla's production in Brandenburg.
2. Consider if there are there any positive or negative effects for residents? Think of which counterarguments might come up from other panellists. How can you respond to them?

Personality: On the one hand, you need to defend the approval for the construction of the factory. On the other hand, you need to show sympathy for residents who are worried or angry. Try to be rhetorically convincing and perhaps even charismatic. You think about other personal qualities that will help you to stand your ground.

Resident of Grünheide

Since residents of Grünheide, the town where the new 'gigafactory' is built, are directly affected by Tesla's project, they should be represented in the Panel Show. However, there are different groups with different views:

a) some have voiced concerns about the effects of the factory for the neighbourhood and the environment;

b) others believe that the factory will bring jobs and prosperity to the little town.

Task:

1. Decide which of the two positions you will represent.
2. As a resident, you demonstrate what has already changed or what potentially could change in the neighbourhood due to the operating factory.

   For a) Which actions do you demand from Tesla or politicians in order to minimise negative effects for residents?

   For b) Which actions do you demand from Tesla or politicians in order to maximise positive effects for residents?
3. Think of which counterarguments might come up from other panellists. How can you dismiss them?

Personality: As someone who lives in the close surroundings of the factory, you are worried and angry about (potential) consequences for the area. You are eager to express the negative impact on your personal life.

Economic expert

Tesla's 'gigafactory' could be an example of clashing economic and environmental interests. You are in the Panel Discussion as an expert who can explain the pros and cons from an economic perspective.

Task:

1. As an economist, you will need to explain to what extent Tesla contributes to economic growth and thereby put emphasis on the company's economic importance for the region, Germany, and the whole world. However, if you believe that there are disadvantages as well, you also need to elaborate on these during the discussion.
2. Think of which counterarguments might come up from other panellists. How can you dismiss them?

Personality: Act in a scientific manner and demonstrate that you rely on research. As you are not personally involved in the issue, you probably will not need to show a lot of emotion. However, you could decide whether you want to show empathy for one (or more of the sides) on the panel.

Satirist

Task: As part of the panel, the satirist actively participates in the discussion and creates a comic relief during a serious debate. In which way can you make fun of arguments other panellists may come up with? You may even be ironic or sarcastic. Yet, this does not mean that everything you say is supposed to be solely entertaining. You can still claim your own opinion, agree with other panellists, or criticize other positions in a satiric way.

Personality: A satirist is not afraid to interact with people. You should be outgoing, spontaneous, and charismatic.

Animator

Task: The animator is responsible for encouraging interaction of the audience with the host and panellists. Before the show begins, you practice with the audience how they can express agreement or disagreement. You are also responsible for collecting questions from the audience either by interrupting the discussion and giving the person from the audience the chance to speak or by forwarding the question to the host or directly to one of the panellists.

Before and after the show, ask the members of the audience to vote which stance they take, i.e., in favour of the factory, supporting it under certain conditions, against it, or indecisive.

Personality: An animator is not afraid to interact with people. You should be outgoing and spontaneous.

Material 5: Word Box – *Personal Qualities for the Panel Show*

Instead of the typical character traits of each role described on the role cards, participants in the Panel Show now adopt various personal qualities. They can either be chosen by the teacher or students, or they can be drawn randomly. You can also think of more personal qualities yourselves.

extremely confident	shy/nervous
sad	happy
bored	quick-tempered
calm	energetic
charming	compassionate
dramatic	egocentric
optimistic	pessimistic
passionate	earnest
strict	very sceptical/eager to contradict other people
…	…
…	…
…	…

Material 6: Video – *How to Moderate a Panel Discussion*

Watch the instruction video and pay attention to the tasks of a host (moderator) in a Panel Show.

Toastmasters International (2020, February 13). *Moderate a Panel Discussion* [Video file]. Retrieved from https://youtu.be/PJgAOkaUrcw

Material 7: Worksheet – *Sustainability*

Take notes of the text on sustainability and the spheres of sustainability presented in the Venn-diagram.

Main notes & keywords:

Comments & questions:

Defining Sustainability

[1] Since the 1970s, there has been an increasing awareness about the vulnerability of our living environment and its momentously exposure to anthropogenic pressure. Our living environment is a sensitive system which easily gets out of balance (Gebhardt et al., 2012).

[2] In 1987, the United Nations (UN) Brundtland Commission came up with a definition for sustainable development as a starting point for the vision to (for) a careful use of resources: *Sustainable development is "meeting the needs of the present without compromising the ability of future generations to meet their own needs"* (Mcdaniel, 1970).

According to the UN, this objective requires an integrated approach that takes into consideration environmental concerns along with economic development (United Nations). The UN definition of sustainable development contains two key concepts:

- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs (United Nations).

[3] Although sustainability is a global goal, its problems and solutions are always importantly situated in local ecologies and communities (Mcdaniel, 1970). Geography seeks to study sustainability at different scale levels – global, regional and local – and considers processes, stakeholders and power discourses in the interplay of place and society (Gebhardt et al., 2012).

Analysing Sustainability

[4] The scope of sustainability is frequently described as including three spheres – social, environmental, and economic. These spheres give us tools to analyse and evaluate the sustainability of different projects. To use an accounting metaphor, sustainability projects must be evaluated according to a "triple bottom line" of social, environmental, and economic responsibility. A Venn diagram depicts the interdisciplinarity of sustainability as a field of inquiry (Mcdaniel, 1970):

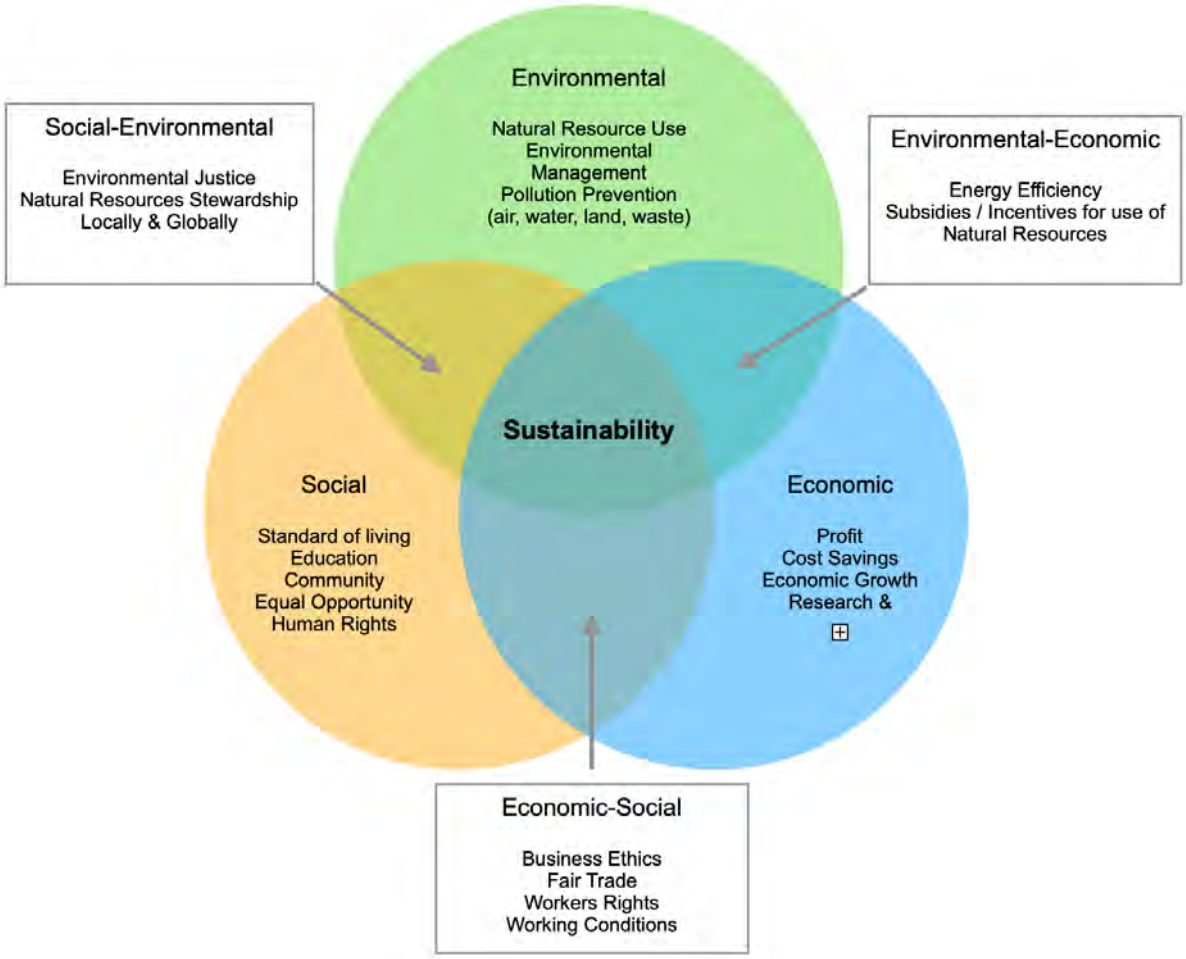


Figure 1: Venn-diagram displaying the spheres of sustainability

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Material 8: Worksheet – *Expressions for Working in Groups* A

Getting into the conversation

- Could I ask a question about this?
- Could I say something?
- I'd like to make a comment here.

If you don't understand or want to check that you've understood correctly

- Sorry, I didn't understand what you said about …
- Sorry, I don't follow. Could you explain that again, please?
- What did you mean about/by …?
- Sorry, I still don't understand.
- So, what you're saying is (that) …?
- Do you mean (that) …?
- If I have understood you correctly, your point is (that) …?

Clarifying your statement

- Sorry, what I meant to say was …
- In other words, …

Describing and reporting

- The text is about …
- The text shows (that) …
- The text reveals (that) …
- The study proves (that) …
- The study suggests (that) …
- The article explains (that) …
- The article observes (that) …
- The author claims (that) …
- The author emphasises/highlights (that) …
- The author doubts (that) …
- According to the author, …
- The author illustrates his/her point of view with/by …
- The main idea is …

Material 8: Worksheet – *Expressions for Working in Groups* B

Assign the following categories to the phrases below: Getting into the conversation – not understanding sth. – clarifying – describing and reporting.

Phrase	**Category**
The text explains (that) …	
Sorry, I don't follow. Could you explain that again, please?	
The main idea of the text is …	
The study suggest (that) …	
Sorry, what I meant to say was …	
According to the text …	
In other words, …	
Could I ask a question, please?	
Could you explain that again, please?	
The article highlights …	
I didn't understand what you said about …	
What did you mean by saying …?	
The author doubts (that) …	
I'd like to make a comment here.	

Material 9: Handout – *Research Questions*

Environmental

- What is the direct impact of the project on the local environment?
- What are the projects likely and possible future impacts on the local and regional environment?
- Does the project contribute to global sustainability?

Environmental – Economic

- What are the environmental costs of the project's economic benefit?
- Does the expansion of individual electric mobility exonerate the environment?
- Is the project's use of natural resources efficient?

Economic

- Why is the region of the Grünheide a profitable place for the project "Gigafactory"?
- How does the factory contribute to local and regional economics?

Economic – Social

- How does Tesla pay their workers?
- What are the working conditions for employees?
- What are the workers' rights?

Social

- How does the infrastructure in the Grünheide region change due to the project "Gigafactory"?
- What is the project's impact on the living costs and living quality in the Grünheide region?

Social – Environmental

- How does the environmental impact of the "Gigafactory" change the living conditions in the Grünheide region and Berlin?

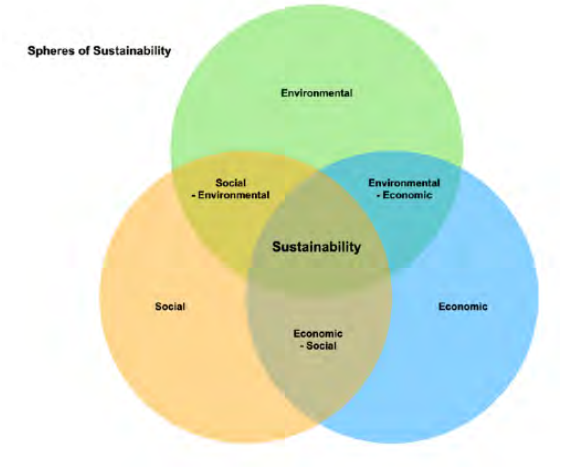

Figure 1: Venn-diagram displaying the spheres of sustainability

Material 10: Texts – *Sources 1–6*

Source 1

23 September 2020,
by Hardy Graupner

Will Critics of German Gigafactory Slow Down Elon Musk?

Authorities in the German state of Brandenburg have been facing a growing group of people who object to the construction of Elon Musk's Gigafactory there in total or in part. Hardy Graupner reports on a public hearing.

[1] It's a day that many critics of Elon Musk's Gigafactory in Grünheide have been waiting a long time for.

[2] Originally scheduled to take place in March this year [2020], a public hearing was pushed back by the onset of the coronavirus pandemic. The number of officially filed complaints has since swollen to 414, underscoring the need for a platform to deal with the concerns of objectors.

[3] Hearing them can no longer be delayed as the construction of the huge Gigafactory plant is already well underway near the idyllic community of Grünheide in the state of Brandenburg, just outside Berlin.

For Tesla, speed is of the essence

[4] "Once there was a forest, now there's a factory" has been one of the slogans most often heard from critics of the plant which is to create up to 12,000 jobs directly and produce half a million electric cars annually as of mid-2021.

[5] With one forest area already cleared and parts of the Gigafactory buildings already standing tall near the A10 highway, objectors haven't tired of pointing out that Musk and his Tesla company still don't have a final building permit from the state's environmental authorities, meaning that Tesla is forging ahead at its own risk and would have to restore the place to what it was like before construction started if the permit is denied.

[6] That, of course, seems rather unlikely, leaving objectors annoyed at the sheer speed of construction work. Tesla aims to complete the factory even faster than its sister plant in Shanghai by using prefab components.

Will complaints be watered down?

[7] While some critics target the logging of trees for the Gigafactory – with yet another forest area to go for a separate highway exit – most complaints center around water supply and water safety concerns among residents in Grünheide and the wider area.

[8] One of the critics, Thomas Löb, told DW the Gigafactory may have a huge impact on the water supply of the wider region, with part of the area being a drinking water protection zone. Löb is head of the Brandenburg branch of the Ecological Democratic Party (ÖDP).

[9] Besides concerns about the vast amount of water that Tesla is expected to need, Löb and many of his fellow objectors don't approve of the company's building technique that involves driving over 500 piles deep into the ground to secure factory foundations.

[10] "These piles pose a big danger," Löb warned. "After all, they could damage numerous natural aquifers that are located directly beneath the factory." He demanded that the concerns of the locals take precedence "rather than the high-flying ambitions of a US businessman."

[11] His concerns were echoed by Michael Ganschow from the Green League Brandenburg, an ecological pressure group. "In principle, it's all very clear – safe water supply for residents is an absolute priority," he told DW. "Only if this is guaranteed can we talk about the interests of Tesla or in fact any other company that wants to be located here – but what we see right now is that this principle is being turned on its head."

Suitable roads and rail links?

[12] Other complaints voiced related to fears that the local infrastructure might not keep abreast of industrial developments in and around the Grünheide community, now a place of under 9,000 inhabitants.

With a final building permit not yet there, Tesla hasn't wasted any time to make its Gigafactory outside Berlin take shape.

[13] Even without the Gigafactory, there are frequent traffic jams during peak hours. Critics fear the situation will get out of control completely with more and more delivery trucks on the road and thousands of employees commuting to the Tesla plant every day in the years ahead.

[14] Additionally, the Gigafactory may only be the beginning of something even bigger. The state of Brandenburg had for many years fought an uphill battle to attract investors, and the arrival of the iconic Tesla brand certainly has the potential to lure more big employers to the region.

Are more electric cars really helpful?

[15] The complaints brought forward at the hearing also went to show that some critics – while welcoming the current campaign in Germany and beyond to switch to renewables and greener ways of transportation – question the philosophy of "clogging up the roads with even more cars, be they environmentally friendly or not," as Sophie Scherger from the Berlin-based PowerShift research team told DW.

[16] “The thing about Tesla is that we actually want fewer cars on the roads in the long run, and we definitely don’t want to see any mass production of big electric SUVs that consume a lot of material, while mining causes considerable damage to the environment,” Scherger argued.

[17] The ÖDP’s Thomas Löb said the Tesla cars to come from the plant in Grünheide “will do nothing to ease any traffic jams on our roads, on the contrary – we’d rather welcome large-scale investments in our insufficient public transport infrastructure.”

[18] The public hearing may continue for several days, depending on how fast the objections can be dealt with by Brandenburg’s environment authorities. Afterwards, the officials will take some more time to analyze the complaints further and come up with a final decision later this fall.

Reading questions:
1. Who are main critics of the project?
2. What are possible opportunities and positive changes for the region?
3a. What direct impact on the environment does the project have?
3b. What may be further potential risks of the project?
3c. How is the production of electric cars evaluated?

Graupner, H. (2020, September 23). Will Critics of German Gigafactory Slow Down Elon Musk? *Deutsche Welle*. https://www.dw.com/en/will-critics-of-german-gigafactory-slow-down-elon-musk/a-55025434

Source 2

16 February 2021 (updated 4 May 2021),
by Jack Ewing and Ivan Penn

The Auto Industry Bets Its Future on Batteries

Carmakers, government agencies and investors are pouring money into battery research in a global race to profit from emission-free electric cars.

[1] As automakers like General Motors, Volkswagen and Ford Motor make bold promises about transitioning to an electrified, emission-free future, one thing is becoming obvious: They will need a lot of batteries.

The lab at QuantumScape, a Silicon Valley start-up whose investors include Volkswagen and Bill Gates, is working on a technology that could make batteries cheaper, more reliable and quicker to recharge. Picture: Gabriela Hasbun for The New York Times

[2] Demand for this indispensable component already outstrips supply, promoting a global gold rush that has investors, established companies and start-ups racing to develop the technology and build the factories needed to churn out millions of electric cars.

[3] Long considered one of the least interesting car components, batteries may now be one of the most exciting parts of the auto industry. Car manufacturing hasn't fundamentally changed in 50 years and is barely profitable, but the battery industry is still ripe for innovation. Technology is evolving at a pace that is reminiscent of the early days of personal computers, mobile phones or even automobiles, and an influx of capital has the potential to mint the next Steve Jobs or Henry Ford.

[4] Wood Mackenzie, an energy research and consulting firm, estimates that electric vehicles will make up 18 percent of new car sales by 2030. That would increase the demand for batteries by about eight times as much as factories can currently produce. And that is a conservative estimate. Some analysts expect electric vehicle sales to grow much faster.

[5] Carmakers are engaged in an intense race to acquire the chemical recipe that will deliver the most energy at the lowest price and in the smallest package. G.M.'s announcement last month that it would go all electric by 2035 was widely considered a landmark moment by policymakers and environmentalists. But to many people in the battery industry, the company was stating the obvious.

[6] "This was the last in a wave of big announcements that very clearly signaled that electric vehicles are here," said Venkat Viswanathan, an associate professor at Carnegie Mellon University who researches battery technology.

[7] Battery manufacturing is dominated by companies like Tesla, Panasonic, LG Chem, BYD China and SK Innovation – nearly all of them based in China, Japan or South Korea. But many new players are getting into the game, and investors, sensing the vast profits at stake, are

hurling money at start-ups that they believe are close to breakthroughs. “I think we’re in the infancy stage,” said Andy Palmer, the former chief executive of Aston Martin and now the nonexecutive vice chairman of InoBat Auto, a battery start-up. “There is more money than there are ideas.”

[8] QuantumScape, a Silicon Valley start-up whose investors include Volkswagen and Bill Gates, is working on a technology that could make batteries cheaper, more reliable and quicker to recharge. But it has no substantial sales, and it could fail to produce and sell batteries. Yet stock market investors consider the company to be more valuable than the French carmaker Renault.

[9] China and the European Union are injecting government funds into battery technology. China sees batteries as crucial to its ambition to dominate the electric vehicle industry. In response, the Chinese government helped Contemporary Amperex Technology, which is partly state-owned, become one of the world’s biggest battery suppliers seemingly overnight.

[10] The European Union is subsidizing battery production to avoid becoming dependent on Asian suppliers and to preserve auto industry jobs. Last month, the European Commission, the bloc’s administrative arm, announced a € 2.9 billion, or $ 3.5 billion, fund to support battery manufacturing and research. That was on top of the more than € 60 billion that European governments and automakers had already committed to electric vehicles and batteries, according to the consulting firm Accenture. Some of the government money will go to Tesla as a reward for the company’s decision to build a factory near Berlin.

[11] The United States is also expected to promote the industry in accordance with President Biden’s focus on climate change and his embrace of electric cars. In a campaign ad last year, Mr. Biden, who owns a 1967 Chevrolet Corvette, said he was looking forward to driving an electric version of the sports car if G.M. decided to make one.

[12] Several battery factories are in the planning or construction phase in the United States, including a factory G.M. is building in Ohio with LG, but analysts said federal incentives for electric car and battery production would be crucial to creating a thriving industry in the United States. So will technological advances by government-funded researchers and domestic companies like QuantumScape and Tesla, which last fall outlined its plans to lower the cost and improve the performance of batteries.

[13] “There’s no secret that China strongly promotes manufacturing and new development,” said Margaret Mann, a group manager in the Center for Integrated Mobility Sciences at the National Renewable Energy Laboratory, a unit of the U.S. Energy Department. “I am not pessimistic,” she said of the United States’ ability to gain ground in battery production. “But I don’t think all of the problems have been solved yet.”

[14] Entrepreneurs working in this area said that these were early days and that U.S. companies could still leapfrog the Asian producers that dominate the industry.

[15] “Today’s batteries are not competitive,” said Jagdeep Singh, chief executive of QuantumScape, which is based in San Jose, Calif. “Batteries have enormous potential and are critical for a renewable energy economy, but they have to get better.”

[16] For the most part, all of the money pouring into battery technology is good news. It puts capitalism to work on solving a global problem. But this reordering of the auto industry will also claim some victims, like the companies that build parts for internal combustion engine cars and

trucks, or automakers and investors that bet on the wrong technology.

QuantumScape's solid state lithium metal cell battery for electric vehicles. Picture: Gabriela Hasbun for The New York Times

[17] "Battery innovations are not overnight," said Venkat Srinivasan, director of the Argonne National Laboratory's Collaborative Center for Energy Storage Science. "It can take you many years. All sorts of things can happen."

[18] Most experts are certain that demand for batteries will empower China, which refines most of the metals used in batteries and produces more than 70 percent of all battery cells. And China's grip on battery production will slip only marginally during the next decade despite ambitious plans to expand production in Europe and the United States, according to projections by Roland Berger, a German management consulting firm.

[19] Battery production has "deep geopolitical ramifications," said Tom Einar Jensen, the chief executive of Freyr, which is building a battery factory in northern Norway to take advantage of the region's abundant wind and hydropower. "The European auto industry doesn't want to rely too much on imports from Asia in general and China in particular," he added.

[20] Freyr plans to raise $ 850 million as part of a proposed merger with Alussa Energy Acquisition Corporation, a shell company that sold shares before it had any assets. The deal, announced in January, would give Freyr a listing on the New York Stock Exchange. The company plans to make batteries using technology developed by 24M Technologies in Cambridge, Mass.

[21] The first priority for the industry is to make batteries cheaper. Batteries for a midsize electric car cost about $ 15,000, or roughly double the price they need to be for electric cars to achieve mass acceptance, Mr. Srinivasan said.

[22] Those savings can be achieved by making dozens of small improvements – like producing batteries close to car factories to avoid shipping costs – and by reducing waste, according to Roland Berger. About 10 percent of the materials that go into making a battery are wasted because of inefficient production methods.

[23] But, in a recent study, Roland Berger also warned that growing demand could push up prices for raw materials like lithium, cobalt and nickel and cancel out some of those efficiency gains. The auto industry is competing for batteries with electric utilities and other energy companies that need them to store intermittent wind and solar power, further driving up demand. "We are getting rumbles there may be a supply crunch this year," said Jason Burwen, interim chief executive for the United States Energy Storage Association.

[24] An entire genre of companies has sprung up to replace expensive minerals used in batteries with materials that are cheaper and more common. OneD Material, based in San Jose, makes a substance that looks like used coffee grounds for use in anodes, the electrode through which power leaves batteries when a vehicle is underway. The material is made from

silicon, which is abundant and inexpensive, to reduce the need for graphite, which is scarcer and more expensive.

[25] Longer term, the industry holy grail is solid state batteries, which will replace the liquid lithium solution at the core of most batteries with solid layers of a lithium compound. Solid state batteries would be more stable and less prone to overheating, allowing faster charging. They would also weigh less.

[26] Toyota Motor and other companies have invested heavily in the technology, and have already succeeded in building some solid state batteries. The hard part is mass producing them at a reasonable cost. Much of the excitement around QuantumScape stems from the company's assertion that it has found a material that solves one of the main impediments to mass production of solid state batteries, namely their tendency to short circuit if there are any imperfections.

[27] Still, most people in the industry don't expect solid state batteries to be widely available until around 2030. Mass producing batteries is "the hardest thing in the world," Elon Musk, Tesla's chief executive, said on a recent conference call with analysts. "Prototypes are easy. Scaling production is very hard."

[28] One thing is certain: It's a great time to have a degree in electrochemistry. Those who understand the properties of lithium, nickel, cobalt and other materials are to batteries what software coders are to computers. Jakub Reiter, for example, has been fascinated with battery chemistry since he was a teenager in the 1990s in Prague, long before that seemed like a hot career choice.

[29] Mr. Reiter was doing graduate research in Germany in 2011 when a headhunter recruited him to work at BMW, which wanted to understand the underlying science of batteries. Last year, InoBat poached him to help set up a factory in Slovakia, where Volkswagen, Kia, Peugeot and Jaguar Land Rover produce cars.

[30] Mr. Reiter is now head of science at InoBat, whose technology allows customers to quickly develop batteries for different uses, like a low-cost battery for a commuter car or a high-performance version for a roadster.

[31] "Twenty years ago, nobody cared much about batteries," Mr. Reiter said. Now, he said, there is intense competition, and "it's a big fight."

Reading questions:

1. Which positive impact may Tesla's factory have for Germany and the European Union? Consider political, social, and economic aspects.
2. What may be the reason for Tesla to produce batteries near its car factory?

Ewing, J. & Penn, I. (2021, February 16). The Auto Industry Bets Its Future on Batteries. *The New York Times*. https://www.nytimes.com/2021/02/16/business/energy-environment/electric-car-batteries-investment.html

Source 3

19 August 2021,
by Johannes Graupner and Angelina Tittmann

The Berlin-Brandenburg Region and the Tesla Gigafactory

Scientific assessment on the settlement of large-scale industrial projects in water-scarce areas.

[1] Tesla's "Gigafactory Berlin-Brandenburg" construction project in Grünheide, and its potential impact on the environment, are the subject of controversial debate. Given the thematic link and close proximity to the Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB), based at Berlin's lake Müggelsee, IGB also receives enquiries about this issue. This has prompted IGB to publish a scientific assessment on the siting of large-scale industrial projects in a relatively water-scarce region.

[2] Having been formed during the Ice Age, the landscape of the Berlin-Brandenburg region is very water-scarce, despite its abundance of water bodies. This is a significant and important difference: although a comparatively large number of surface water bodies are visible in Berlin-Brandenburg (Fig.1), the region is one of the areas with the lowest rainfall in Germany [DWD 2019]. Despite the fact that three rivers – the Spree, the Dahme and the Havel – flow through Berlin, they carry little water compared to other major rivers in Germany. As a result, relatively little water is available for the ecosystems as well as the various water uses. The pressure of use is already comparatively high in the Spree catchment area.

[3] Apart from the amount of available water (quantity), its condition (quality) also plays a crucial role. Both aspects – and how they interact – must be considered in equal measure when assessing water use.

[4] From a water management perspective, commercial, public and private development projects affect water demand, water abstraction and water treatment, as well as wastewater flow, wastewater treatment and the discharge of treated wastewater. The effects in each of the aforementioned areas can influence or restrict the public conservation objectives (in accordance with Section 6 of the Federal Water Act (WHG)) for water bodies (e.g., the good ecological status of water bodies) as well as other uses (e.g., drinking water abstraction, fisheries or recreational uses such as water sports). These individual aspects are discussed in greater detail below.

Assessing long-term consequences, making data bases public, and weighing up conflicting goals

[5] Besides providing valuable habitat, groundwater and surface waters are also important resources. This repeatedly leads to conflicting goals between the protection and use of these ecosystems, as well as between different competing uses. Based on IGB's scientific evaluation, it is therefore all the more important to have a precise knowledge of the impact of existing and planned uses on the conservation objectives set out in legislation. This enables the assessment of the overall effect on the water system and is especially crucial in water-scarce regions such as the Spree catchment and the Greater Berlin area. For such an analysis, it is

appropriate to consider the many different ecosystem services[1] that freshwater ecosystems provide. It is also necessary to assess which interventions or actions will change these services, and in what way. Decisions in permit procedures should be made transparently and on the basis of the best possible technical expertise and reliable data from ecohydrology and freshwater ecology. The threat to protected areas, species and aquatic ecosystems in general should be kept to a minimum in accordance with legal requirements (e.g., the Federal Water Act (WHG), the Water Framework Directive (WFD), and the Habitats Directive (HD)). It is only legally permissible to compromise the status of surface waters and groundwater bodies in very limited exceptional cases.

[6] In the case of large-scale projects, the decision-making basis and data should always be publicly accessible, given their high social relevance. This enables various stakeholders to conduct independent analyses. Ecohydrological, limnological, chemical and biological data should be used to weigh up decisions related to drinking water and groundwater protection, and sensitive habitats. Such data and models, e.g., on the flow behaviour of surface waters and groundwater under certain conditions and scenarios, should be integrated into the long-term risk assessment with a level of quality commensurate with the complex issue at hand. In the process, the water quantity and quality values observed in the past cannot be assumed to hold for the future without further consideration. After all, the expected effects of climate change in the post-mining landscape must be taken into account. In the absence of such data and information, or where it is of insufficient quality, it should be collected on behalf of the public in accordance with scientific quality standards, and made publicly available.

[7] An explanation is given below of fundamental aspects concerning water and freshwater ecosystems that require urgent consideration when siting industrial projects in the Berlin-Brandenburg region. The current situation, water quantity and quality predictions, and water management aspects have already been explained in detail in the Brandenburg Climate Report of the *Deutscher Wetterdienst* [DWD 2019], the Low Water Report of the Senate Department for the Environment, Transport and Climate Protection [SenUVK 2021a], and the Low Water Concept of the Ministry of Agriculture, Environment and Climate Protection [MLUK 2021]. The SenUVK is currently developing a Water Master Plan, which should contain measures and strategies to meet both current and future challenges [SenUVK2021b].

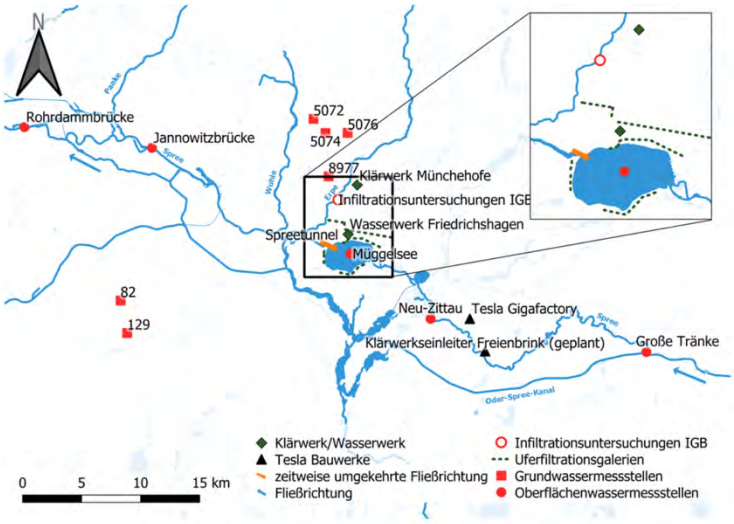

Figure 1: Overview map of water bodies, sampling points, and water supply and wastewater disposal infrastructure.

[1] Ecosystem services are services provided by nature for humans; for an explanation in the context of water bodies, see e.g., https://www.resi-project.info/warum-oekosystemleistungen-hintergrund/ and https://www.umweltbundesamt.de/leistungen-nutzen-renaturierter-fluesse#okosystemleistungen-von-fliessgewassern.

Water scarcity and a growing demand for water in the region

[8] Despite having an abundance of water bodies, Berlin-Brandenburg is one of the most water-scarce regions in Germany, with low rainfall levels [DWD 2019]. The region contains rather limited near-surface freshwater aquifers, with saltwater aquifers predominating from a depth of about 300 metres [TU Berlin 2020].

[9] The annual mean temperature and the number of summer days (with a maximum temperature of at least 25°C) can be expected to increase as a result of climate change. No significant increase in annual precipitation is expected between now and 2050. However, precipitation rates will be distributed differently throughout the year: while there will be less rain in the summer months, precipitation will increase in spring and winter. In addition, local heavy rainfall events will occur more frequently. In general, climate change will lead to a clustering of extreme weather events such as prolonged drought, further exacerbating the already critical situation of regional water availability [DWD 2019].

[10] Higher temperatures lead to an increase in evaporation from water surfaces, from soils and by plants (evapotranspiration). This phenomenon not only reduces the amount of water available, but also has a negative impact on water quality and ecosystems [DWD 2019, SenUVK 2021a]. The recent drought in the Berlin-Brandenburg region (2018) showed just how vulnerable hydrographic networks are to reduced precipitation due to temporary desiccation, and highlighted the importance of having vegetation and different forms of land use in the regional context [Kleine et al. 2021].

[11] Prolonged dry spells lead to a deterioration of the water holding capacity of soils, which in turn affects the groundwater recharge rate [DWD 2019]. A change in precipitation patterns towards more heavy rainfall events in the wake of climate change would also lead to lower groundwater recharge because, instead of infiltrating into the ground, more water from the area would run off the surface or evaporate.

[12] Based on current climate forecasts, local storm water leaching is therefore necessary for all sealed surfaces. According to Section 3.2 of the Environmental Impact Assessment (EIA) for Tesla's construction project, there are plans to ensure storm water leaching. To this end, the Brandenburg State Office for the Environment (LfU) issued a permit on 13 September 2021 for the early start of the construction of stormwater infiltration systems [LfU 2021].Since undesirable substances may be mobilised and transported from sealed surfaces by precipitation water, however, the quality of the precipitation runoff should be tested regularly, which, according to the EIA documents, is also intended [LfU 2021]. It may be the case that pre-treatment, e.g., using filter systems, is required prior to infiltration so as to intercept undesirable substances and prevent the contamination of adjacent ecosystems and groundwater.

[13] Groundwater recharge data from the past 30 years already show a predominantly negative trend [DWD 2019]. Figure 2 shows examples of declining groundwater levels in the region. Besides causing a reduction in the quantity of water in surface waters, declining groundwater levels are also problematic for ground-water-dependent ecosystems such as peatlands [Klingenfuß et al. 2015], forests and urban trees, as well as water management facilities [SenUVK 2021a]. Seen from a historical perspective, landscape drainage (drainage, river regulation, draining of peatlands) initially promoted the agricultural use of land in the region [Nützmann et al. 2011]. However, climate change and the demand for water by humans and nature necessitate a rethink towards a near-natural water balance with long retention times in the region through increased water retention.

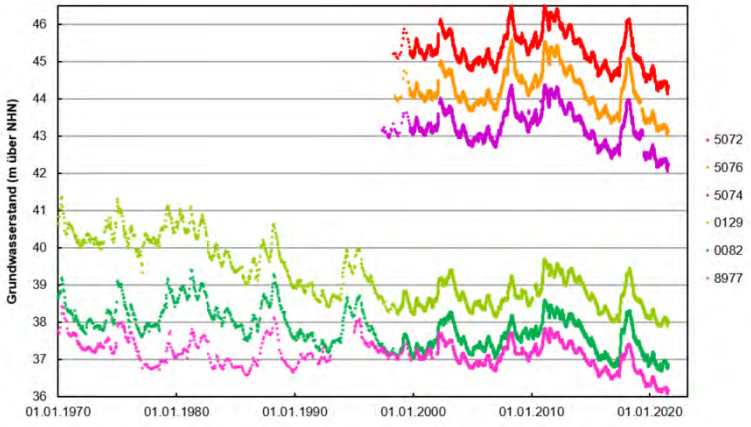

Figure 2: Declining groundwater levels at monitoring points of the Berlin Senate. All monitoring points are located on the Barnim Plateau (red shades) or the Teltow Plateau (green shades); the exact location is shown in Fig. 1.

[14] Another challenge is the increasing demand for water in the region. Berlin's continuing population growth results in a greater demand for water and new areas of land being sealed. The increasing development of the "stockbroker belt" also results in additional land sealing, which in turn reduces groundwater recharge and water retention in the landscape. The trend towards owning a home in the countryside is driving the demand for private garden irrigation. As a result of climate change, there is also a growing need for irrigation of inner-city green spaces and gardens, and of agricultural land. Tesla's Gigafactory will be an additional user: the factory's water requirements are specified as 1.4 million cubic metres per year in the current EIA documents [LfU 2021]. This equates to the water demand of a town with 31.000 inhabitants.

Increasing contamination from trace organic compounds

[15] Trace organic compounds are chemical compounds produced by humans. They are contained in products such as pharmaceuticals, detergents, pesticides, anti-corrosion agents, paints and lacquers. Trace organic compounds are often very persistent and present in low concentrations in surface waters, groundwater and drinking water. Even low concentrations of some trace substances can have potentially negative impacts on ecosystems or human health. Many of these substances are water-soluble, and can only be broken down partially, or not at all, in wastewater treatment plants. As a result, they are discharged into freshwater ecosystems via wastewater treatment plants, as well as via other sources such as rainwater runoff. From as early as 2009, IGB has measured considerable levels of contamination of the surface water with trace organic compounds in the Erpe, a tributary of the Spree River into which the *Münchehofe* wastewater treatment plant drains (Fig. 3). Consequently, the authorisation of additional discharges from industrial projects such as the Tesla Gigafactory should be

examined very closely, because they could lead to an increase in pollutant loads. This is particularly important in the capital region because groundwater and surface waters are the basis for drinking water supplies. Around 60% of Berlin's drinking water is obtained via bank filtration, which is surface water that undergoes months of natural purification underground before being extracted [ALK1]. A further 10% is from groundwater recharge, which also comes from surface waters [SenUVK 2021 b].

[16] Berlin's water supply and wastewater disposal system is based on a partially closed water cycle. As a result, the city's drinking water resources are potentially vulnerable to persistent contaminants because a proportion of treated wastewater is extracted downstream again as drinking water. A yet unpublished study by IGB conducted on the Erpe River east of Berlin below the final effluent discharge point of *Münchehofe* wastewater treatment plant ("Infiltration studies IGB" in Fig. 1) showed that trace substances from the Erpe are discharged into the aquifer close to the river and then transported towards a battery of wells belonging to *Berliner Wasserbetriebe* (BWB). Investigations by BWB indicated that trace substances are already present in these drinking water wells (northernmost bank filtration gallery in Fig. 1) [BWB, personal communication with Uwe Dünnbier, 14 June 2021].

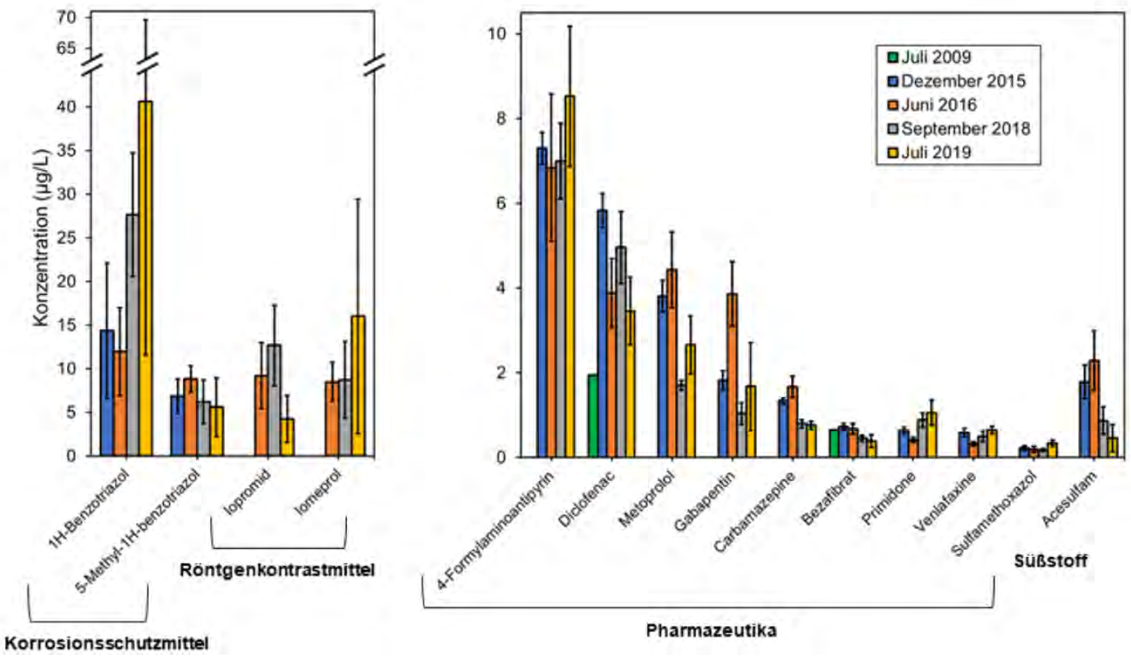

Figure 3: The concentration of selected trace compounds in the Erpe downstream of the discharge of Münchehofe wastewater treatment plant between 2009 and 2019. | Data sources: July 2009: Lewandowski et al. [2009], December 2015: Schaper et al. [2018], June 2016: Jaeger et al. [2019], September 2018: Mueller et al. [2021], July 2019: unpublished data from Hanna Schulz. The median of concentrations from the samples taken is given, error bars show the interquartile range (2009: composite sample, hence no interquartile range).

[17] This example shows that drinking water in the Greater Berlin area could be more heavily contaminated with trace organic compounds in the future. For this reason, new major sources of contamination should be avoided wherever possible.

[18] The predicted longer dry spells, enhanced evapotranspiration and a higher demand for water may also result in an increased reversal of the flow direction of the Spree and, in the

long term, a higher pollutant load of the Müggelsee, and therefore also of the adjacent bank filtration wells for drinking water production [SenUVK 2021b].

[19] This is because in the case of prolonged drought, such as in summer 2019, the Stadtspree, which is already exposed to treated wastewater from the Erpe and Panke, flows back into the Müggelsee against its normal direction of flow (arrow next to Spreetunnel in Fig. 1). Various scenarios on climate change, population development and construction measures were considered in the Water Master Plan. In the future, the Spree will increasingly flow backwards for an average of 3 to 6 months per year, depending on the scenario [SenUVK 2021b]. This could exacerbate existing risks to drinking water quality, which would likewise necessitate a particularly careful examination of the potential additional discharge of pollutants, e.g., from industrial plants.

[20] According to the relevant tender documents, wastewater from the Tesla Gigafactory is to be discharged into the Müggelspree via a newly planned municipal wastewater treatment plant in Freienbrink [WSE 2021]. This discharge could result in a permanently elevated contamination of the Müggelsee and the surrounding bank filtration wells with trace organic compounds, since the lake is downstream from the proposed discharge point. This would further exacerbate the existing problems outlined above.

[21] The extent of contamination will essentially be heavily dependent on the substances used in the production process, the purification technology in the Tesla Gigafactory's in-house wastewater treatment plant, and the equipment and management of the municipal wastewater treatment plant in Freienbrink, which is yet to be built. In any case, it will not be possible to completely eliminate undesirable substances from the water even with a fourth treatment stage (usually activated carbon or ozonation). Emission prevention should therefore generally be applied in accordance with the polluter-pays principle.

Additional pollutant loads: sulphate in freshwater ecosystems and drinking water

[22] Tesla also requests the discharge of sulphate (SO 42-) via wastewater (effluent standard <600 mg/L, Section 10.7of the EIA documents [LfU 2021]), which could further increase sulphate levels in the Spree and Müggelsee. Sulphate concentrations in the Spree are already high, which particularly results from active and abandoned opencast lignite mines in the Spree catchment area. IGB's long-term sulphate monitoring along the Spree shows that sulphate levels in the surface water of the Spree have been very high for years, often reaching the drinking water threshold of 250 mg/L (Fig. 4) [IGB 2016]. For this reason, any additional contamination of the Spree with sulphate should be avoided.

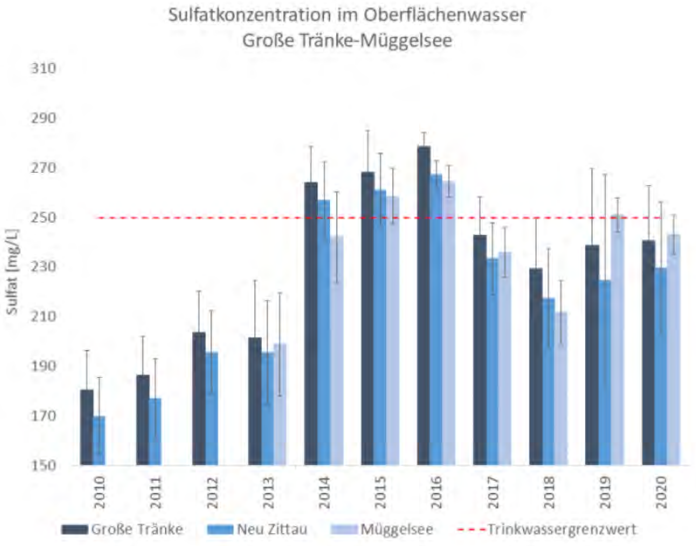

Figure 4: Sulphate concentration [mg/L] in surface water of the Spree from east to west (Große Tränke-Müggelsee) in the period 2010-2020, data on sulphate levels are not available for every year at all sites; red dotted line: drinking water threshold value, error bars: standard deviation [mg/L], without error bars: only one or two measured values available.

Summary and conclusion

[23] Drawing on many years of research in the Spree catchment, IGB emphasises how important it is to closely examine existing and future exploitation interests, since water and freshwater bodies in the region are already heavily burdened resources and ecosystems.

[24] In the case of large-scale projects, the decision-making basis and data should always be publicly accessible, given their high social relevance. This enables various stakeholders to conduct independent analyses. Decisions in permit procedures should be made transparently and on the basis of the best possible technical expertise and reliable data from ecohydrology and freshwater ecology. The threat to protected areas, species and aquatic ecosystems in general should be kept to a minimum in accordance with legal requirements (e.g., the Federal Water Act (WHG), the Water Framework Directive (WFD), and the Habitats Directive (HD)).

[25] Such close scrutiny is important because the siting of large-scale industrial projects can further exacerbate the already critical water availability and aquatic pollution in regions like Berlin-Brandenburg where water and precipitation are scarce. The effects of climate change, such as temperature increases, heavy rainfall events and prolonged dry spells, combined with a simultaneous increase in water demand, require measures that promote a near-natural water balance with long retention times in the landscape, rather than restricting it even further.

[26] To assess the specific risks to freshwater ecosystems and the ecosystem services they provide (drinking water, irrigation, fisheries, tourism and recreational use, etc.), permit procedures must include a fundamental assessment of water availability and public, commercial and private water demand – not only as an annual average, but also specifically for the critical summer months.

[27] In view of the regional problems described above, when it comes to major industrial sites, care should be taken not only to ensure that applicable environmental legislation is complied with, but also that companies' management of their water demand, wastewater and precipitation water contributes to a climate-adapted regional water balance, rather than further exacerbating aquatic pollution. To achieve this, environmental and economic policy should be much better interlinked. As a matter of principle, water and freshwater ecosystems should also be taken into account in economic policy decisions across ministries as important, sensitive and limited resources.

[28] For this reason, IGB endorses the principles formulated in the draft National Water Strategy of the Federal Ministry for the Environment [BMU 2021] that companies should be held responsible for aquatic pollution and the substances and products they emit over the entire life cycle, and should pay an appropriate price for the use of water and freshwater ecosystems accordingly. The ultimate goal should be to achieve water-saving production with largely closed water cycles that automatically prevent substances from being emitted into freshwaters. State-of-the-art wastewater treatment technologies should be implemented and continuously updated.

[29] From a scientific perspective, it is essential to have climate-adapted water resource management that accommodates both (drinking) water protection and the needs of different user groups as sustainably as possible, and that also sets clear priorities for situations of scarcity.

For the sake of context: The role of IGB as a public research institute – creating new knowledge, advising the public objectively

[30] IGB is a public non-university research institute that conducts basic research in aquatic ecology, and also integrates application issues into its scientific work. If IGB has decision-relevant research data, the institute is gladly willing to make such data available to other stakeholders who wish to contribute to environmental impact assessments and decision processes. However, drawing up targeted expert opinions, such as in the context of the environmental impact assessment of construction projects, is not among the institute's core tasks.

[31] As a research institute, IGB always attaches particular importance to the reliability and scientific robustness of its assessments. Therefore, IGB does not make any statements on specific individual cases, unless the institute has its own data base that allows it to make concrete statements accordingly, or if there is a lack of accessible data that meet research quality criteria. The institute itself is not an environmental policy actor, but provides objective advice to politicians, authorities, business and civil society on the basis of its own scientific findings and the current state of the relevant fields of research.

Reading questions:

1. Why is the comparably large number of waterbodies in the Berlin Brandenburg area no indicator for the actual availability of water in the region?
2. Water scarcity due to climate change is already a threat to the region. What are the factors explained in the text that influence the water availability?
3. Why are water and freshwater bodies in the region already burdened resources?
4. In what way is the drinking and freshwater supply of the region vulnerable to already existing and possible future contaminations?
5. How does humans demand for water in the region impact the water scarcity?

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Source 4

13 September 2019,
by Henrik Böhme

Opinion: Tesla's Germany Plans are No Coincidence

In typical Elon Musk style, he almost casually announced plans to build the European Tesla factory on the outskirts of Berlin. For German carmakers the plans have come just at the right time, says Henrik Böhme.

[1] Let's pretend for a moment that Berlin's huge new airport has been operational for some time. Then, the new Tesla factory could have even been built on the site of the old Tegel airport – and thus in Berlin itself.

[2] But it seems that the rumors about the Berlin-Brandenburg airport disaster – with its opening delayed until at least next year – has spread to Tesla's board room because the hectic and not uncontroversial Elon Musk could not resist cracking a joke at its expense. Tesla certainly aims to get its new factory finished much faster than the troubled airport's planners (construction began in 2006).

[3] The new Tesla facilities – called a Gigafactory because Elon Musk always likes to go one bigger – will now be built in a little-known place called Grünheide, to the southeast of Berlin, close to what may be, eventually, the new airport. Above all, it is being built in the state of Brandenburg, which means the neighboring state and city of Berlin will miss out on any trade taxes generated from the project.

Speed is of the essence

[4] The interstate rivalry probably doesn't much interest Musk, unless he simply doesn't trust the Berliners to be quick enough. Despite its tiny size, Berlin still has plenty of space to settle, especially in the eastern part. But Musk is in a hurry, and the new factory must be built fast.

[5] Why? Because Germany's car manufacturers have (finally!) recognized the sign of the times and are stepping up their investment in electric-powered cars. And I'm sure Musk must have noticed that Volkswagen, a little over a week ago, gave the go-ahead for its own electric car factory in Zwickau in the Eastern state of Saxony. Once the plant is retrofitted from combustion-engine to electric car production in 2021, the world's largest auto manufacturer wants 330,000 purely electric-powered vehicles to run off its production lines every year.

[6] But that's not all: two other VW facilities in Germany are just starting to be retrofitted, and VW is now also adding electric car factories in China and the United States.

[7] If Tesla was initially a laughingstock, it will soon be a serious competitor to Germany's automakers. The ambitious startup has had problems with mass production and is carrying around a gigantic mountain of debt. So, if VW, the world's largest volume manufacturer – besides Toyota – enters the fray in such an ambitious way, albeit belatedly, then this is a serious threat for Tesla. Therefore, Musk's decision to build a plant in Germany must be seen as a declaration of war.

New jobs at the right time

[8] Even the so-called luxury car segment, in which Tesla predominantly plays, its biggest competition comes from Germany – Porsche with its Taycan, Audi with the E-Tron series and Daimler's Mercedes EQC. Even in China, where Tesla has built up its third Gigafactory in just 10 months and test production has just started, dozens of direct competitors such as Byton, Wey and Hongqi are lined up in the starting blocks. Tesla's decision to produce cars in Germany means the race for electric car supremacy is now underway in the same country where the car engine was first invented.

[9] Despite many unanswered questions, the new factory is great news for people in the region. Several thousand new jobs will be created, and they couldn't come at a better time. Just south of the planned factory – in Lusatia – thousands of jobs are set to be lost as a result of the decision to phase out lignite (brown coal) extraction.

[10] Bets are now being taken on which project will be finished sooner – the new Berlin airport or Tesla's German Gigafactory.

Reading questions:
1. Why is it important for Tesla to build the new Gigafactory in Germany?
2. Why is it important for Tesla to build the Gigafactory as fast as possible?
3. How do the people in Brandenburg benefit from the Gigafactory?
4. Why is the creation of jobs through the Gigafactory so important for the region at the moment?

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Source 5

16 September 2020,
by Alex Pichaloff

Tesla's Gigafactory is Coming, but not Everyone is Happy

Some have called it a huge opportunity for the region, while others think it's a risk. One year since Tesla announced their plans to build a Gigafactory in Brandenburg, how has the US electric car giant been received in Grünheide?

[1] If you're driving along *Autobahn* 10, just to the southeast of Berlin, you can't miss it. One minute it's nothing but Brandenburger forest either side of the road, but then suddenly there's a clearing, and if you drive a little further, you see a heap of cranes, machinery and vehicles working away. This is not just any old construction site. For starters, it's big – the size of around 420 football fields, in fact. But that's not all. This area is the site of Tesla's under construction Gigafactory, which, depending on who you ask, represents either one of the biggest opportunities or one of the biggest risks to life in this idyllic pocket of Brandenburg.

[2] It all started in November last year. Elon Musk, the CEO of the US electric car giant, was in Berlin for *Das Goldene Lenkrad* vehicle awards show. As he walked on stage to accept the award for best mid-sized vehicle of the year – won by Tesla's Model 3 car – everything seemed to be going perfectly normally: He thanked his staff, the hosts of the evening and said he was thrilled about the win. But then, seemingly out of nowhere, he dropped a bombshell.

[3] "I actually have an announcement that will be hopefully well received," he said. "We've decided to put the Tesla Gigafactory Europe in the Berlin area."

[4] Speculation immediately broke out over where exactly this was going to be. More details came to light in January, when it was announced that Tesla had purchased a 300-hectare site at Grünheide for just over € 40 million. This site hugs the *Autobahn* around 30 km southeast of the *Hauptstadt*'s centre, and only 5 km from Berlin's state border with Brandenburg, near the town of Erkner.

[5] If the site seemed large, so too did the ambitions of the company, which seemed determined not to be a repeat of the Berlin Airport nightmare. Tesla officials said they planned to have the first stage of the € 4bn project completed by June 2021, by which stage the plant is expected to have the capacity to produce 500,000 Tesla Model Y vehicles per year. Tesla also said that it would have up to 12,000 workers on site, a significant figure given that the municipality of Grünheide only has a population of just under 9000.

[6] The company's announcement was largely met with praise from political figures. Not only would the factory bolster the development of electric-powered vehicles in Germany, thereby helping to meet climate goals, but the decision to use Brandenburg as a location would provide much-needed investment and economic opportunity to a region that has struggled to attract major projects since the Wende.

Wrong place, right time?

The Gigafactory's southern entrance under construction in July.

[7] Despite the initial enthusiasm, however, criticism quickly began to emerge. "When I found out in November 2019 what Tesla and the authorities were planning, I immediately decided to fight," says Grünheide local Frank Gersdorf. "It was clear to me that the nature and the livelihood of the people here would be destroyed."

[8] The 56-year-old, who was born and raised in the area, lives with his wife about 800 metres from the Gigafactory site. In January, Gersdorf and some other like-minded locals set up the *Bürgerinitiative Grünheide*, a citizens' initiative campaigning against the project. The critics have a seemingly never-ending list of concerns, ranging from infrastructure to the construction approval process and overall transparency.

[9] For most of the dissenters, the project's environmental impact has remained the primary issue. The felling of 90 hectares of pine forest in February, as part of the first stage of the project, raised concerns about the impact on local fauna. Another critical ecological factor is water. Large chunks of the proposed factory sit within a designated *Wasserschutzgebiet* (water protection zone).

[10] Specifically, the site falls across two different water protection categories – 3a and 3b – with both containing a series of rules preventing certain types of industrial activity from taking place. "The main point of criticism from our side is that the location simply isn't suitable," says Steffen Schorcht, who for the past 25 years has lived in Erkner. "We have water protection zones to minimise the risk of contaminating the groundwater," he explains. "That's why you're not allowed to build certain things within them, like a chemicals factory – and Tesla is in its character a chemicals factory."

[11] Schorcht notes that Tesla's Gigafactory would have a wide production range, meaning more activities taking place there than at Volkswagen's Wolfsburg plant, for example. "They have a painting facility there, they have an aluminium foundry," he says. "They have a lot of processes that involve chemicals, and therefore there's a risk that pollutants could be released into the groundwater."

[12] The 59-year-old electrical engineer has campaigned on water protection issues in the area for more than 20 years and is intimately familiar with the relevant laws and local history. He says his opposition to the project isn't based in ideological opposition to industry. "We don't have anything against Tesla, or the energy or transport transition – quite the opposite actually. For us, the issue is the location."

[13] The main blame, in Schorcht's opinion, lies at the hands of the SPD-led state government in Brandenburg – he feels they should never have offered Tesla the site in the first place.

[14] Not everyone in the area agrees with him: supporters of the Gigafactory project point to the fact that the site has been officially listed by the state government as a *Gewerbegebiet* (commercial zone) for around two decades. In fact, BMW came close to building their own vehicle assembly plant on the site in the early 2000s before eventually deciding on Leipzig. Schorcht, by way of rebuttal, argues that the site should not have been offered to BMW, either, and suggests that the state government's development plan for the site is likely to be challenged in court.

[15] "From our point of view, that is very legally questionable," he says. "They've tried to open a backdoor to offer Tesla something quickly so that the company builds here in Brandenburg." Exberliner contacted the press office of Jörg Steinbach, Brandenburg's minister for economy, work and industry, however he was unavailable for comment.

Tesla's black box

[16] Critics have also highlighted the construction approval process as a point of concern. Over the past year, the *Landesamt für Umwelt* – the independent body responsible for issuing environmental permits for construction projects in Brandenburg – has granted Tesla five provisional permits: these have allowed the company to clear the 90 hectares of forest and begin construction without the need for a final environmental approval.

[17] It has been pointed out that this is well within the law, under paragraph 8a of the *Bundes-Immissionsschutzgesetzt* (Federal Emission Control Act), and that numerous other projects have utilised this paragraph in the past. Yet detractors have raised ethical questions over the practice, fearing it could be used as a precedent for other major projects in the future.

[18] Sebastian Walter is one such opponent. "Yes, it has been used before," he says, "but this paragraph 8a has been used by small companies or private builders. To give out so many provisional permits for such a large project is legally possible, but I think the question should be: Is what is legally possible also.

[19] Walter, 30, is the chairman of *Die Linke*'s parliamentary group in the Brandenburg state parliament. "I find it difficult," he adds, "to think that this factory could be finished, but the final environmental assessment and the final building permit could still be awaiting approval." One potentially risky (and costly) complication of this process is that if the project's final environmental permit is denied, then Tesla would be legally responsible for dismantling the entire factory and returning the site to its previous condition – no mean feat for a 90-hectare site which, before construction began, was a pine forest.

[20] "It is very, very difficult to return the site to its original state," says Schorcht. "That's another criticism: you can't simply give out provisional permits if it's not possible to return the site to its original condition."

[21] Another bone of contention is the matter of transparency, with politicians and locals alike frustrated by the lack of information coming from the California-based company. Walter says that, while *Die Linke* certainly aren't against the project, they do have a number of questions regarding the environmental impact, working conditions at the factory and the pressure the development will place on local infrastructure and the local community – but they aren't getting anything out of Tesla.

A Tesla Factory in Fremont, USA.

[22] “There was a moment when Tesla came to parliament, and I was really happy that they were actually there,” he recounts. “But they just showed their PowerPoint presentation and no one was allowed to ask questions.”

[23] Such an approach is simply inappropriate to German parliament, Walter suggests, as it would be in the United States. “This is one of the largest economic and industrial projects of the past few decades, and you can’t just organise it all from the green table – or from Twitter, as Elon Musk does,” he says. “You have to come here and talk to the people.” Exberliner also approached Tesla for comment, but did not receive a reply to its press request.

Manufacturing consent?

[24] It would be misleading to characterise the Gigafactory story as a simple David and Goliath battle, with a money-hungry American company on one side and powerless local residents on the other. For one thing, there haven’t been any official opinion polls or research into the matter, so it has proven particularly difficult to gauge public sentiment in the region. The protests – and subsequent counter-protests in favour of the project – that took place in Grünheide in January and February also didn’t seem to shed much light. Many complained that the majority of those present weren’t from the region at all, with some demonstrators coming from as far and wide as Berlin and Bavaria.

[25] Different stakeholders have varying perceptions of public opinion. Schorcht and Gersdorf are convinced that opposition to the project is growing, based on increased contact they’ve been receiving from concerned locals and the development of other citizens’ initiatives in the area. In advance of public meetings between Tesla and locals in September, it was revealed that 414 groups and citizens had submitted official objections to the project. Gersdorf believes that local opinion has been misrepresented by politicians – in their staunch support of the project – and the German press, by not reporting objectively enough.

[26] “The mood was artificially pushed in a positive direction from the very beginning,” he argues. “Statements like, ‘This is like drawing the six in the lottery’, or that the project was of ‘national and even international importance to Germany’, silenced a lot of critics.”

[27] Others see the situation differently, however. Christine de Bailly runs the local Netz-Werk-Laden in Grünheide, a volunteer-run community centre located in the town’s Marktplatz. Since January, the Netz-Werk-Laden has hosted weekly Tesla information evenings on Tuesdays from 5 to 7pm, where two communications consultants contracted by Tesla are on hand to answer questions and provide updates on the project.

[28] De Bailly says the role of the information evenings isn’t to convince people of the virtues of the project, but simply to inform people of what is going on and let them make up their own minds. De Bailly feels that public sentiment has shifted throughout the year, with occasional

outright resistance – many locals were concerned about the impact of clearing the forest at the site – now largely replaced by a sense of cautiousness, even curiosity.

[29] “There are a lot of people who like to drive past and see how it’s coming along, how quickly it’s growing,” she says. “‘What’s happening? How’s it looking? Will we get jobs?’ People are asking these types of things.”

[30] Regardless of where the majority stands, it’s clear that a number of Grünheide residents are supportive of the project. De Bailly, for one, is hopeful the factory will act as a kind of accelerator to help boost infrastructure and connectivity in the area. “It’s long overdue,” she says. “We’ve been working for a long time, trying to get the train to stop here more often and improve the bus services.”

[31] Another local at ease with the project is Lukas Haiß. The 27-year-old says that, while he’s not particularly enthusiastic about the Gigafactory, he is comfortable with the development going ahead.

[32] “The site has been classified as a commercial zone for a long time, and I think it’d be good if we could use it for that purpose,” he argues. “As for the fact that it’s Tesla, that doesn’t really interest me personally, but I like the sustainability aspect, in the sense of more investment in electric mobility and research and development.”

[33] It has been 12 months since Elon Musk walked on stage and broke the news that Tesla was coming to Brandenburg. In the past year, a lot has happened in Grünheide: protests, community engagement and a massive construction site – not to mention the Corona pandemic. Still, with Tesla pushing full steam ahead with construction, and opponents determined to stand their ground, it seems the saga of Grünheide’s Gigafactory will play on for a while yet.

Reading questions:
1. Who are the parties involved in the discourse on the project “Tesla´s Gigafactory“?
2. Who is (un)happy with the project? Note for each party in a few words what position they take concerning the topic.
3. What are possible opportunities and positive changes for the region?
4. What direct impact on the environment does the project have?
5. What may be further potential risks of the project?
6. What is the expected impact of the project on the local community?

Pichaloff, A. (2020, September 16). Tesla’s Gigafactory is Coming, but not Everyone is Happy. *Ex-berliner*. https://www.exberliner.com/politics/tesla-gigafactory/

Source 6

3 January 2022,
by Nathan Eddy

German Union Steps Up Efforts to Recruit Tesla Workers with Office near Berlin Plant?

IG Metall says automaker offers lower pay than German rivals.

About 12,000 employees are expected to build up to 500,000 electric cars a year in Gruenheide, with production expected to start early this year.

[1] BERLIN – IG Metall, the dominant metalworkers' union in Germany, wants to represent as many employees as possible at Tesla's new factory in near Berlin. The union has opened an office "very close" to the factory in Grünheide, its district leader for Berlin, Brandenburg and Saxony, Birgit Dietze, said.

[2] Besides supporting the election of a works council, the union will be available to answer questions on topics including pay, working hours and employment contracts, Dietze told the German Press Agency (DPA).

[3] Tesla CEO Elon Musk has had a rocky relationship with organized labor in the past and was ordered in March last year to delete a tweet from 2018 threatening to strip U.S. employees of their stock options if they formed a union.

[4] IG Metall has said job applicants have told them that the automaker is offering pay 20 percent below the collectively bargained wages paid by German automakers. Tesla is also shaking up conventional German contracts by offering packages with stock options and bonuses rather than predetermined holiday pay.

[5] Musk has made his irritation for German laws and processes known, saying in a letter to authorities in April that the country's complex planning requirements were at odds with the urgency needed to fight climate change. The automaker has repeatedly had to push back the expected opening of the factory due to environmental objections and red tape.

[6] In the future, about 12,000 employees are expected to build up to 500,000 electric cars a year in Gruenheide, with production expected to start early this year. The union understands that 1,800 workers had been hired by Christmas, the DPA reported. "We assume that the first production stage will start with about 6,000 employees," Dietze told the news outlet. She also pointed out additional players in the automotive industry will be established around the plant. "In terms of transformation, it is necessary to take the employees with us," Dietze said. "We are not the dinosaurs of the industrial age but are looking forward in a progressive way. We are actively intervening in the issues of shaping industrial policy."

[7] Should collective bargaining one day occur between the union and Tesla, one point of contention would already be foreseeable. According to her findings, part of Tesla's compensation should be achieved through stock options, Dietze told the DPA. "Optionally, on top of a

secured collective bargaining standard like that of the metal and electrical industry, we would have no objection," the trade unionist said. "But what generally does not work in our members' estimation is that parts of the remuneration are so thoroughly flexible that the employee does not know exactly what is coming out for them at the end of the month or the year?"

Reading questions:
1. What is the metalworker's union (IG Metall) for?
2. How do workers profit from the union?
3. What has Tesla's relationship with unions been like in the past?
4. How does Tesla pay its employees?
5. How do the employment contracts differ from other German contracts?

Eddy, N. (2022, January 3). German Union Steps Up Efforts to Recruit Tesla Workers with Office near Berlin Plant. Automotive News Europe. https://europe.autonews.com/automakers/german-union-steps-efforts-recruit-tesla-workers-office-near-berlin-plant

Material 11: Texts – *Sources+ 1–6*

Source 1+

23 September 2020,
by Hardy Graupner

Will Critics of German Gigafactory Slow Down Elon Musk?

Authorities in the German state of Brandenburg have been facing a growing group of people who object to the construction of Elon Musk's Gigafactory there in total or in part. Hardy Graupner reports on a public hearing.

[1] It's a day that many critics of Elon Musk's Gigafactory in Grünheide have been waiting a long time for.

[2] Originally scheduled to take place in March this year [2020], a public hearing was pushed back by the onset of the coronavirus pandemic. The number of officially filed complaints has since swollen to 414, underscoring the need for a platform to deal with the concerns of objectors.

[3] Hearing them can no longer be delayed as the construction of the huge Gigafactory plant is already well underway near the idyllic community of Grünheide in the state of Brandenburg, just outside Berlin.

For Tesla, speed is of the essence

[4] "Once there was a forest, now there's a factory" has been one of the slogans most often heard from critics of the plant which is to create up to 12,000 jobs directly and produce half a million electric cars annually as of mid-2021.

[5] With one forest area already cleared and parts of the Gigafactory buildings already standing tall near the A10 highway, objectors haven't tired of pointing out that Musk and his Tesla company still don't have a final building permit from the state's environmental authorities, meaning that Tesla is forging ahead at its own risk and would have to restore the place to what it was like before construction started if the permit is denied.

[6] That, of course, seems rather unlikely, leaving objectors annoyed at the sheer speed of construction work. Tesla aims to complete the factory even faster than its sister plant in Shanghai by using prefab components.

Will complaints be watered down?

[7] While some critics target the logging of trees for the Gigafactory – with yet another forest area to go for a separate highway exit – most complaints center around water supply and water safety concerns among residents in Grünheide and the wider area.

[8] One of the critics, Thomas Löb, told DW the Gigafactory may have a huge impact on the water supply of the wider region, with part of the area being a drinking water protection zone. Löb is head of the Brandenburg branch of the Ecological Democratic Party (ÖDP).

[9] Besides concerns about the vast amount of water that Tesla is expected to need, Löb and many of his fellow objectors don't approve of the company's building technique that involves driving over 500 piles deep into the ground to secure factory foundations.

[10] "These piles pose a big danger," Löb warned. "After all, they could damage numerous natural aquifers that are located directly beneath the factory." He demanded that the concerns of the locals take precedence "rather than the high-flying ambitions of a US businessman."

[11] His concerns were echoed by Michael Ganschow from the Green League Brandenburg, an ecological pressure group. "In principle, it's all very clear – safe water supply for residents is an absolute priority," he told DW. "Only if this is guaranteed can we talk about the interests of Tesla or in fact any other company that wants to be located here – but what we see right now is that this principle is being turned on its head."

Suitable roads and rail links?

[12] Other complaints voiced related to fears that the local infrastructure might not keep abreast of industrial developments in and around the Grünheide community, now a place of under 9,000 inhabitants.

With a final building permit not yet there, Tesla hasn't wasted any time to make its Gigafactory outside Berlin take shape.

[13] Even without the Gigafactory, there are frequent traffic jams during peak hours. Critics fear the situation will get out of control completely with more and more delivery trucks on the road and thousands of employees commuting to the Tesla plant every day in the years ahead.

[14] Additionally, the Gigafactory may only be the beginning of something even bigger. The state of Brandenburg had for many years fought an uphill battle to attract investors, and the arrival of the iconic Tesla brand certainly has the potential to lure more big employers to the region.

Are more electric cars really helpful?

[15] The complaints brought forward at the hearing also went to show that some critics – while welcoming the current campaign in Germany and beyond to switch to renewables and greener ways of transportation – question the philosophy of "clogging up the roads with even more cars, be they environmentally friendly or not," as Sophie Scherger from the Berlin-based PowerShift research team told DW.

[16] “The thing about Tesla is that we actually want fewer cars on the roads in the long run, and we definitely don’t want to see any mass production of big electric SUVs that consume a lot of material, while mining causes considerable damage to the environment,” Scherger argued.

[17] The ÖDP’s Thomas Löb said the Tesla cars to come from the plant in Grünheide “will do nothing to ease any traffic jams on our roads, on the contrary – we’d rather welcome large-scale investments in our insufficient public transport infrastructure.”

[18] The public hearing may continue for several days, depending on how fast the objections can be dealt with by Brandenburg’s environment authorities. Afterwards, the officials will take some more time to analyze the complaints further and come up with a final decision later this fall.

Reading questions:
1. Who are main critics of the project?
2. What are possible opportunities and positive changes for the region? [4, 14]
3a. What direct impact on the environment does the project have? [4, 7–11]
3b. What may be further potential risks of the project? [12–14]
3c. How is the production of electric cars evaluated? [4, 15–17]

Graupner, H. (2020, September 23). Will Critics of German Gigafactory Slow Down Elon Musk? *Deutsche Welle*. https://www.dw.com/en/will-critics-of-german-gigafactory-slow-down-elon-musk/a-55025434

Source 2+

16 February 2021 (updated 4 May 2021),
by Jack Ewing and Ivan Penn

The Auto Industry Bets Its Future on Batteries

Carmakers, government agencies and investors are pouring money into battery research in a global race to profit from emission-free electric cars.

[1] As automakers like General Motors, Volkswagen and Ford Motor make bold promises about transitioning to an electrified, emission-free future, one thing is becoming obvious: They will need a lot of batteries.

The lab at QuantumScape, a Silicon Valley start-up whose investors include Volkswagen and Bill Gates, is working on a technology that could make batteries cheaper, more reliable and quicker to recharge. Picture: Gabriela Hasbun for The New York Times

[2] Demand for this indispensable component already outstrips supply, promoting a global gold rush that has investors, established companies and start-ups racing to develop the technology and build the factories needed to churn out millions of electric cars.

[3] Long considered one of the least interesting car components, batteries may now be one of the most exciting parts of the auto industry. Car manufacturing hasn't fundamentally changed in 50 years and is barely profitable, but the battery industry is still ripe for innovation. Technology is evolving at a pace that is reminiscent of the early days of personal computers, mobile phones or even automobiles, and an influx of capital has the potential to mint the next Steve Jobs or Henry Ford.

[4] Wood Mackenzie, an energy research and consulting firm, estimates that electric vehicles will make up 18 percent of new car sales by 2030. That would increase the demand for batteries by about eight times as much as factories can currently produce. And that is a conservative estimate. Some analysts expect electric vehicle sales to grow much faster.

[5] Carmakers are engaged in an intense race to acquire the chemical recipe that will deliver the most energy at the lowest price and in the smallest package. G.M.'s announcement last month that it would go all electric by 2035 was widely considered a landmark moment by policymakers and environmentalists. But to many people in the battery industry, the company was stating the obvious.

[6] "This was the last in a wave of big announcements that very clearly signaled that electric vehicles are here," said Venkat Viswanathan, an associate professor at Carnegie Mellon University who researches battery technology.

[7] Battery manufacturing is dominated by companies like Tesla, Panasonic, LG Chem, BYD China and SK Innovation – nearly all of them based in China, Japan or South Korea. But many new players are getting into the game, and investors, sensing the vast profits at stake, are hurling money at start-ups that they believe are close to breakthroughs. “I think we’re in the infancy stage,” said Andy Palmer, the former chief executive of Aston Martin and now the nonexecutive vice chairman of InoBat Auto, a battery start-up. “There is more money than there are ideas.”

QuantumScape’s solid state lithium metal cell battery for electric vehicles. Picture: Gabriela Hasbun for The New York Times

[8] QuantumScape, a Silicon Valley start-up whose investors include Volkswagen and Bill Gates, is working on a technology that could make batteries cheaper, more reliable and quicker to recharge. But it has no substantial sales, and it could fail to produce and sell batteries. Yet stock market investors consider the company to be more valuable than the French carmaker Renault.

[9] China and the European Union are injecting government funds into battery technology. China sees batteries as crucial to its ambition to dominate the electric vehicle industry. In response, the Chinese government helped Contemporary Amperex Technology, which is partly state-owned, become one of the world’s biggest battery suppliers seemingly overnight.

[…]

[10] “Battery innovations are not over-night,” said Venkat Srinivasan, director of the Argonne National Laboratory’s Collaborative Center for Energy Storage Science. “It can take you many years. All sorts of things can happen.”

[11] Most experts are certain that demand for batteries will empower China, which refines most of the metals used in batteries and produces more than 70 percent of all battery cells. And China’s grip on battery production will slip only marginally during the next decade despite ambitious plans to expand production in Europe and the United States, according to projections by Roland Berger, a German management consulting firm.

[12] Battery production has “deep geopolitical ramifications,” said Tom Einar Jensen, the chief executive of Freyr, which is building a battery factory in northern Norway to take advantage of the region’s abundant wind and hydropower. “The European auto industry doesn’t want to rely too much on imports from Asia in general and China in particular,” he added.

[13] Freyr plans to raise $ 850 million as part of a proposed merger with Alussa Energy Acquisition Corporation, a shell company that sold shares before it had any assets. The deal, announced in January, would give Freyr a listing on the New York Stock Exchange. The company plans to make batteries using technology developed by 24M Technologies in Cambridge, Mass.

[14] The first priority for the industry is to make batteries cheaper. Batteries for a midsize electric car cost about $ 15,000, or roughly double the price they need to be for electric cars to achieve mass acceptance, Mr. Srinivasan said.

[…]

[15] “Twenty years ago, nobody cared much about batteries,” Mr. Reiter said. Now, he said, there is intense competition, and “it’s a big fight.”

Reading questions:
1. Which positive impact may Tesla’s factory have for Germany and the European Union? Consider political, social, and economic aspects. [9 f., 11 f.]
2. What may be the reason for Tesla to produce batteries near its car factory? [14 f.]

Ewing, J. & Penn, I. (2021, February 16). The Auto Industry Bets Its Future on Batteries. *The New York Times*. https://www.nytimes.com/2021/02/16/business/energy-environment/electric-car-batteries-investment.html

Source 3+

19 August 2021,
by Johannes Graupner and Angelina Tittmann

The Berlin-Brandenburg Region and the Tesla Gigafactory

Scientific assessment on the settlement of large-scale industrial projects in water-scarce areas.

[1] Tesla's "Gigafactory Berlin-Brandenburg" construction project in Grünheide, and its potential impact on the environment, are the subject of controversial debate. Given the thematic link and close proximity to the Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB), based at Berlin's lake Müggelsee, IGB also receives enquiries about this issue. This has prompted IGB to publish a scientific assessment on the siting of large-scale industrial projects in a relatively water-scarce region.

[2] Having been formed during the Ice Age, the landscape of the Berlin-Brandenburg region is very water-scarce, despite its abundance of water bodies. This is a significant and important difference: although a comparatively large number of surface water bodies are visible in Berlin-Brandenburg (Fig.1), the region is one of the areas with the lowest rainfall in Germany [DWD 2019]. Despite the fact that three rivers – the Spree, the Dahme and the Havel – flow through Berlin, they carry little water compared to other major rivers in Germany. As a result, relatively little water is available for the ecosystems as well as the various water uses. The pressure of use is already comparatively high in the Spree catchment area.

[3] Apart from the amount of available water (quantity), its condition (quality) also plays a crucial role. Both aspects – and how they interact – must be considered in equal measure when assessing water use.

[4] From a water management perspective, commercial, public and private development projects affect water demand, water abstraction and water treatment, as well as wastewater flow, wastewater treatment and the discharge of treated wastewater. The effects in each of the aforementioned areas can influence or restrict the public conservation objectives (in accordance with Section 6 of the Federal Water Act (WHG)) for water bodies (e.g., the good ecological status of water bodies) as well as other uses (e.g., drinking water abstraction, fisheries or recreational uses such as water sports). These individual aspects are discussed in greater detail below.

Assessing long-term consequences, making data bases public, and weighing up conflicting goals

[5] Besides providing valuable habitat, groundwater and surface waters are also important resources. This repeatedly leads to conflicting goals between the protection and use of these ecosystems, as well as between different competing uses. Based on IGB's scientific evaluation, it is therefore all the more important to have a precise knowledge of the impact of existing and planned uses on the conservation objectives set out in legislation. This enables the assessment of the overall effect on the water system and is especially crucial in water-scarce regions such as the Spree catchment and the Greater Berlin area. For such an analysis, it is

appropriate to consider the many different ecosystem services[1] that freshwater ecosystems provide. It is also necessary to assess which interventions or actions will change these services, and in what way. Decisions in permit procedures should be made transparently and on the basis of the best possible technical expertise and reliable data from ecohydrology and freshwater ecology. The threat to protected areas, species and aquatic ecosystems in general should be kept to a minimum in accordance with legal requirements (e.g., the Federal Water Act (WHG), the Water Framework Directive (WFD), and the Habitats Directive (HD)). It is only legally permissible to compromise the status of surface waters and groundwater bodies in very limited exceptional cases.

[6] In the case of large-scale projects, the decision-making basis and data should always be publicly accessible, given their high social relevance. This enables various stakeholders to conduct independent analyses. Ecohydrological, limnological, chemical and biological data should be used to weigh up decisions related to drinking water and groundwater protection, and sensitive habitats. Such data and models, e.g., on the flow behaviour of surface waters and groundwater under certain conditions and scenarios, should be integrated into the long-term risk assessment with a level of quality commensurate with the complex issue at hand. In the process, the water quantity and quality values observed in the past cannot be assumed to hold for the future without further consideration. After all, the expected effects of climate change in the post-mining landscape must be taken into account. In the absence of such data and information, or where it is of insufficient quality, it should be collected on behalf of the public in accordance with scientific quality standards, and made publicly available.

[7] An explanation is given below of fundamental aspects concerning water and freshwater ecosystems that require urgent consideration when siting industrial projects in the Berlin-Brandenburg region. The current situation, water quantity and quality predictions, and water management aspects have already been explained in detail in the Brandenburg Climate Report of the *Deutscher Wetterdienst* [DWD 2019], the Low Water Report of the Senate Department for the Environment, Transport and Climate Protection [SenUVK 2021a], and the Low Water Concept of the Ministry of Agriculture, Environment and Climate Protection [MLUK 2021]. The SenUVK is currently developing a Water Master Plan, which should contain measures and strategies to meet both current and future challenges [SenUVK2021b].

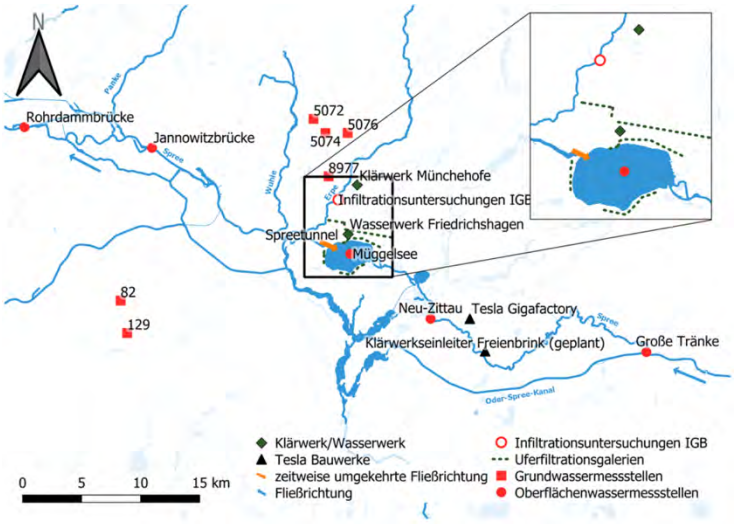

Figure 1: Overview map of water bodies, sampling points, and water supply and wastewater disposal infrastructure.

[1] Ecosystem services are services provided by nature for humans; for an explanation in the context of water bodies, see e.g., https://www.resi-project.info/warum-oekosystemleistungen-hintergrund/ and https://www.umweltbundesamt.de/leistungen-nutzen-renaturierter-fluesse#okosystemleistungen-von-fliessgewassern.

Water scarcity and a growing demand for water in the region

[8] Despite having an abundance of water bodies, Berlin-Brandenburg is one of the most water-scarce regions in Germany, with low rainfall levels [DWD 2019]. The region contains rather limited near-surface freshwater aquifers, with saltwater aquifers predominating from a depth of about 300 metres [TU Berlin 2020].

[9] The annual mean temperature and the number of summer days (with a maximum temperature of at least 25°C) can be expected to increase as a result of climate change. No significant increase in annual precipitation is expected between now and 2050. However, precipitation rates will be distributed differently throughout the year: while there will be less rain in the summer months, precipitation will increase in spring and winter. In addition, local heavy rainfall events will occur more frequently. In general, climate change will lead to a clustering of extreme weather events such as prolonged drought, further exacerbating the already critical situation of regional water availability [DWD 2019].

[10] Higher temperatures lead to an increase in evaporation from water surfaces, from soils and by plants (evapotranspiration). This phenomenon not only reduces the amount of water available, but also has a negative impact on water quality and ecosystems [DWD 2019, SenUVK 2021a]. The recent drought in the Berlin-Brandenburg region (2018) showed just how vulnerable hydrographic networks are to reduced precipitation due to temporary desiccation, and highlighted the importance of having vegetation and different forms of land use in the regional context [Kleine et al. 2021].

[11] Prolonged dry spells lead to a deterioration of the water holding capacity of soils, which in turn affects the groundwater recharge rate [DWD 2019]. A change in precipitation patterns towards more heavy rainfall events in the wake of climate change would also lead to lower groundwater recharge because, instead of infiltrating into the ground, more water from the area would run off the surface or evaporate.

[12] Based on current climate forecasts, local storm water leaching is therefore necessary for all sealed surfaces. According to Section 3.2 of the Environmental Impact Assessment (EIA) for Tesla's construction project, there are plans to ensure storm water leaching. To this end, the Brandenburg State Office for the Environment (LfU) issued a permit on 13 September 2021 for the early start of the construction of stormwater infiltration systems [LfU 2021]. Since undesirable substances may be mobilised and transported from sealed surfaces by precipitation water, however, the quality of the precipitation runoff should be tested regularly, which, according to the EIA documents, is also intended [LfU 2021]. It may be the case that pre-treatment, e.g., using filter systems, is required prior to infiltration so as to intercept undesirable substances and prevent the contamination of adjacent ecosystems and groundwater.

[13] Groundwater recharge data from the past 30 years already show a predominantly negative trend [DWD 2019]. Figure 2 shows examples of declining groundwater levels in the region. Besides causing a reduction in the quantity of water in surface waters, declining groundwater levels are also problematic for ground-water-dependent ecosystems such as peatlands [Klingenfuß et al. 2015], forests and urban trees, as well as water management facilities [SenUVK 2021a]. Seen from a historical perspective, landscape drainage (drainage, river regulation, draining of peatlands) initially promoted the agricultural use of land in the region [Nützmann et al. 2011]. However, climate change and the demand for water by humans and nature necessitate a rethink towards a near-natural water balance with long retention times in the region through increased water retention.

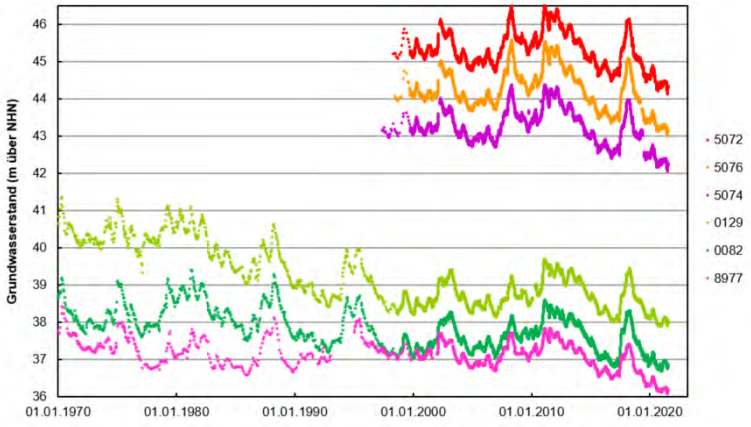

Figure 2: Declining groundwater levels at monitoring points of the Berlin Senate. All monitoring points are located on the Barnim Plateau (red shades) or the Teltow Plateau (green shades); the exact location is shown in Fig. 1.

[14] Another challenge is the increasing demand for water in the region. Berlin's continuing population growth results in a greater demand for water and new areas of land being sealed. The increasing development of the "stockbroker belt" also results in additional land sealing, which in turn reduces groundwater recharge and water retention in the landscape. The trend towards owning a home in the countryside is driving the demand for private garden irrigation. As a result of climate change, there is also a growing need for irrigation of inner-city green spaces and gardens, and of agricultural land. Tesla's Gigafactory will be an additional user: the factory's water requirements are specified as 1.4 million cubic metres per year in the current EIA documents [LfU 2021]. This equates to the water demand of a town with 31.000 inhabitants.

Increasing contamination from trace organic compounds

[15] Trace organic compounds are chemical compounds produced by humans. They are contained in products such as pharmaceuticals, detergents, pesticides, anti-corrosion agents, paints and lacquers. Trace organic compounds are often very persistent and present in low concentrations in surface waters, groundwater and drinking water. Even low concentrations of some trace substances can have potentially negative impacts on ecosystems or human health. Many of these substances are water-soluble, and can only be broken down partially, or not at all, in wastewater treatment plants. As a result, they are discharged into freshwater ecosystems via wastewater treatment plants, as well as via other sources such as rainwater runoff. From as early as 2009, IGB has measured considerable levels of contamination of the surface water with trace organic compounds in the Erpe, a tributary of the Spree River into which the *Münchehofe* wastewater treatment plant drains (Fig. 3). Consequently, the authorisation of additional discharges from industrial projects such as the Tesla Gigafactory should be

examined very closely, because they could lead to an increase in pollutant loads. This is particularly important in the capital region because groundwater and surface waters are the basis for drinking water supplies. Around 60% of Berlin's drinking water is obtained via bank filtration, which is surface water that undergoes months of natural purification underground before being extracted [ALK1]. A further 10% is from groundwater recharge, which also comes from surface waters [SenUVK 2021 b].

[16] Berlin's water supply and wastewater disposal system is based on a partially closed water cycle. As a result, the city's drinking water resources are potentially vulnerable to persistent contaminants because a proportion of treated wastewater is extracted downstream again as drinking water. A yet unpublished study by IGB conducted on the Erpe River east of Berlin below the final effluent discharge point of *Münchehofe* wastewater treatment plant ("Infiltration studies IGB" in Fig. 1) showed that trace substances from the Erpe are discharged into the aquifer close to the river and then transported towards a battery of wells belonging to *Berliner Wasserbetriebe* (BWB). Investigations by BWB indicated that trace substances are already present in these drinking water wells (northernmost bank filtration gallery in Fig. 1) [BWB, personal communication with Uwe Dünnbier, 14 June 2021].

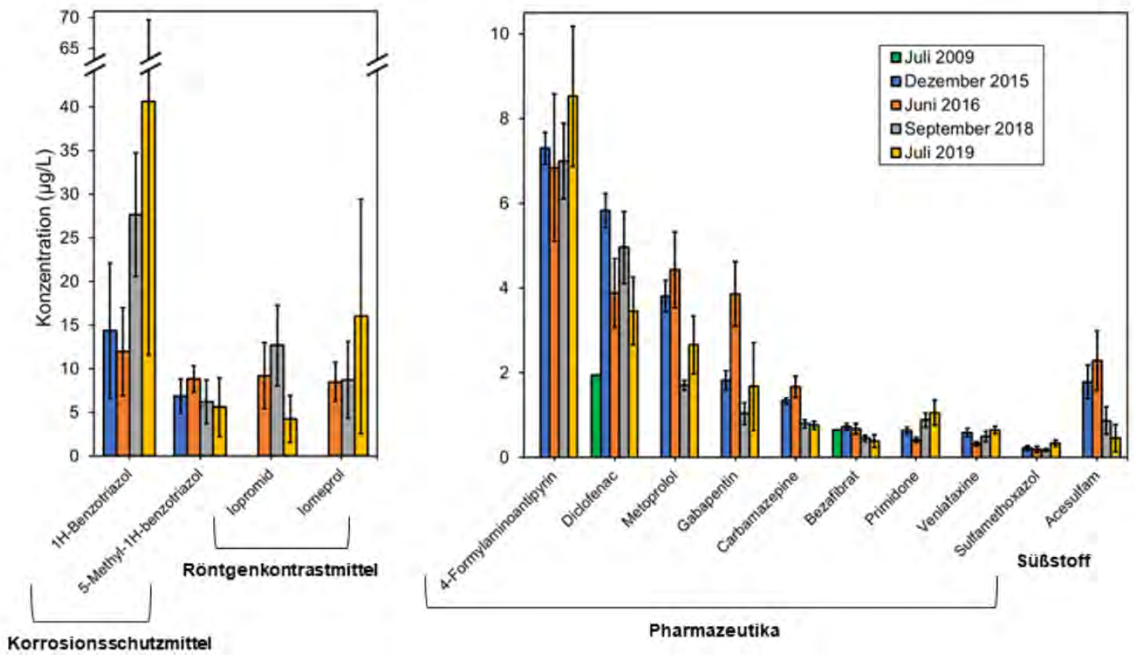

Figure 3: The concentration of selected trace compounds in the Erpe downstream of the discharge of Münchehofe wastewater treatment plant between 2009 and 2019. | Data sources: July 2009: Lewandowski et al. [2009], December 2015: Schaper et al. [2018], June 2016: Jaeger et al. [2019], September 2018: Mueller et al. [2021], July 2019: unpublished data from Hanna Schulz. The median of concentrations from the samples taken is given, error bars show the interquartile range (2009: composite sample, hence no interquartile range).

[17] This example shows that drinking water in the Greater Berlin area could be more heavily contaminated with trace organic compounds in the future. For this reason, new major sources of contamination should be avoided wherever possible.

[18] The predicted longer dry spells, enhanced evapotranspiration and a higher demand for water may also result in an increased reversal of the flow direction of the Spree and, in the

long term, a higher pollutant load of the Müggelsee, and therefore also of the adjacent bank filtration wells for drinking water production [SenUVK 2021b].

[19] This is because in the case of prolonged drought, such as in summer 2019, the Stadtspree, which is already exposed to treated wastewater from the Erpe and Panke, flows back into the Müggelsee against its normal direction of flow (arrow next to Spreetunnel in Fig. 1). Various scenarios on climate change, population development and construction measures were considered in the Water Master Plan. In the future, the Spree will increasingly flow backwards for an average of 3 to 6 months per year, depending on the scenario [SenUVK 2021b]. This could exacerbate existing risks to drinking water quality, which would likewise necessitate a particularly careful examination of the potential additional discharge of pollutants, e.g., from industrial plants.

[20] According to the relevant tender documents, wastewater from the Tesla Gigafactory is to be discharged into the Müggelspree via a newly planned municipal wastewater treatment plant in Freienbrink [WSE 2021]. This discharge could result in a permanently elevated contamination of the Müggelsee and the surrounding bank filtration wells with trace organic compounds, since the lake is downstream from the proposed discharge point. This would further exacerbate the existing problems outlined above.

[21] The extent of contamination will essentially be heavily dependent on the substances used in the production process, the purification technology in the Tesla Gigafactory's in-house wastewater treatment plant, and the equipment and management of the municipal wastewater treatment plant in Freienbrink, which is yet to be built. In any case, it will not be possible to completely eliminate undesirable substances from the water even with a fourth treatment stage (usually activated carbon or ozonation). Emission prevention should therefore generally be applied in accordance with the polluter-pays principle.

Additional pollutant loads: sulphate in freshwater ecosystems and drinking water

[22] Tesla also requests the discharge of sulphate (SO 42-) via wastewater (effluent standard <600 mg/L, Section 10.7of the EIA documents [LfU 2021]), which could further increase sulphate levels in the Spree and Müggelsee. Sulphate concentrations in the Spree are already high, which particularly results from active and abandoned opencast lignite mines in the Spree catchment area. IGB's long-term sulphate monitoring along the Spree shows that sulphate levels in the surface water of the Spree have been very high for years, often reaching the drinking water threshold of 250 mg/L (Fig. 4) [IGB 2016]. For this reason, any additional contamination of the Spree with sulphate should be avoided.

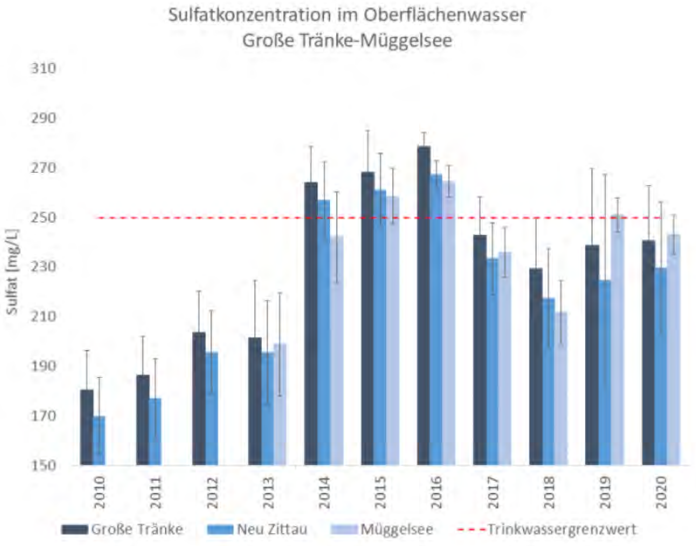

Figure 4: Sulphate concentration [mg/L] in surface water of the Spree from east to west (Große Tränke-Müggelsee) in the period 2010-2020, data on sulphate levels are not available for every year at all sites; red dotted line: drinking water threshold value, error bars: standard deviation [mg/L], without error bars: only one or two measured values available.

Summary and conclusion

[23] Drawing on many years of research in the Spree catchment, IGB emphasises how important it is to closely examine existing and future exploitation interests, since water and freshwater bodies in the region are already heavily burdened resources and ecosystems.

[24] In the case of large-scale projects, the decision-making basis and data should always be publicly accessible, given their high social relevance. This enables various stakeholders to conduct independent analyses. Decisions in permit procedures should be made transparently and on the basis of the best possible technical expertise and reliable data from ecohydrology and freshwater ecology. The threat to protected areas, species and aquatic ecosystems in general should be kept to a minimum in accordance with legal requirements (e.g., the Federal Water Act (WHG), the Water Framework Directive (WFD), and the Habitats Directive (HD)).

[25] Such close scrutiny is important because the siting of large-scale industrial projects can further exacerbate the already critical water availability and aquatic pollution in regions like Berlin-Brandenburg where water and precipitation are scarce. The effects of climate change, such as temperature increases, heavy rainfall events and prolonged dry spells, combined with a simultaneous increase in water demand, require measures that promote a near-natural water balance with long retention times in the landscape, rather than restricting it even further.

[26] To assess the specific risks to freshwater ecosystems and the ecosystem services they provide (drinking water, irrigation, fisheries, tourism and recreational use, etc.), permit procedures must include a fundamental assessment of water availability and public, commercial and private water demand – not only as an annual average, but also specifically for the critical summer months.

[27] In view of the regional problems described above, when it comes to major industrial sites, care should be taken not only to ensure that applicable environmental legislation is complied with, but also that companies' management of their water demand, wastewater and precipitation water contributes to a climate-adapted regional water balance, rather than further exacerbating aquatic pollution. To achieve this, environmental and economic policy should be much better interlinked. As a matter of principle, water and freshwater ecosystems should also be taken into account in economic policy decisions across ministries as important, sensitive and limited resources.

[28] For this reason, IGB endorses the principles formulated in the draft National Water Strategy of the Federal Ministry for the Environment [BMU 2021] that companies should be held responsible for aquatic pollution and the substances and products they emit over the entire life cycle, and should pay an appropriate price for the use of water and freshwater ecosystems accordingly. The ultimate goal should be to achieve water-saving production with largely closed water cycles that automatically prevent substances from being emitted into freshwaters. State-of-the-art wastewater treatment technologies should be implemented and continuously updated.

[29] From a scientific perspective, it is essential to have climate-adapted water resource management that accommodates both (drinking) water protection and the needs of different user groups as sustainably as possible, and that also sets clear priorities for situations of scarcity.

For the sake of context: The role of IGB as a public research institute – creating new knowledge, advising the public objectively

[30] IGB is a public non-university research institute that conducts basic research in aquatic ecology, and also integrates application issues into its scientific work. If IGB has decision-relevant research data, the institute is gladly willing to make such data available to other stakeholders who wish to contribute to environmental impact assessments and decision processes. However, drawing up targeted expert opinions, such as in the context of the environmental impact assessment of construction projects, is not among the institute's core tasks.

[31] As a research institute, IGB always attaches particular importance to the reliability and scientific robustness of its assessments. Therefore, IGB does not make any statements on specific individual cases, unless the institute has its own data base that allows it to make concrete statements accordingly, or if there is a lack of accessible data that meet research quality criteria. The institute itself is not an environmental policy actor, but provides objective advice to politicians, authorities, business and civil society on the basis of its own scientific findings and the current state of the relevant fields of research.

Reading questions:
1. Why is the comparably large number of waterbodies in the Berlin Brandenburg area no indicator for the actual availability of water in the region? [2 f., 8 f.]
2. Water scarcity due to climate change is already a threat to the region. What are the factors explained in the text that influence the water availability? [9, 10–13, 19]
3. Why are water and freshwater bodies in the region already burdened resources? [23, 25]
4. In what way is the drinking and freshwater supply of the region vulnerable to already existing and possible future contaminations? [15 f.]
5. How does humans demand for water in the region impact the water scarcity? [14]

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Source 4+

13 September 2019,
by Henrik Böhme

Opinion: Tesla's Germany Plans are No Coincidence

In typical Elon Musk style, he almost casually announced plans to build the European Tesla factory on the outskirts of Berlin. For German carmakers the plans have come just at the right time, says Henrik Böhme.

[1] Let's pretend for a moment that Berlin's huge new airport has been operational for some time. Then, the new Tesla factory could have even been built on the site of the old Tegel airport – and thus in Berlin itself.

[2] But it seems that the rumors about the Berlin-Brandenburg airport disaster – with its opening delayed until at least next year – has spread to Tesla's board room because the hectic and not uncontroversial Elon Musk could not resist cracking a joke at its expense. Tesla certainly aims to get its new factory finished much faster than the troubled airport's planners (construction began in 2006).

[3] The new Tesla facilities – called a Gigafactory because Elon Musk always likes to go one bigger – will now be built in a little-known place called Grünheide, to the southeast of Berlin, close to what may be, eventually, the new airport. Above all, it is being built in the state of Brandenburg, which means the neighboring state and city of Berlin will miss out on any trade taxes generated from the project.

Speed is of the essence

[4] The interstate rivalry probably doesn't much interest Musk, unless he simply doesn't trust the Berliners to be quick enough. Despite its tiny size, Berlin still has plenty of space to settle, especially in the eastern part. But Musk is in a hurry, and the new factory must be built fast.

[5] Why? Because Germany's car manufacturers have (finally!) recognized the sign of the times and are stepping up their investment in electric-powered cars. And I'm sure Musk must have noticed that Volkswagen, a little over a week ago, gave the go-ahead for its own electric car factory in Zwickau in the Eastern state of Saxony. Once the plant is retrofitted from combustion-engine to electric car production in 2021, the world's largest auto manufacturer wants 330,000 purely electric-powered vehicles to run off its production lines every year.

[6] But that's not all: two other VW facilities in Germany are just starting to be retrofitted, and VW is now also adding electric car factories in China and the United States.

[7] If Tesla was initially a laughingstock, it will soon be a serious competitor to Germany's automakers. The ambitious startup has had problems with mass production and is carrying around a gigantic mountain of debt. So, if VW, the world's largest volume manufacturer – besides Toyota – enters the fray in such an ambitious way, albeit belatedly, then this is a serious threat for Tesla. Therefore, Musk's decision to build a plant in Germany must be seen as a declaration of war.

New jobs at the right time

[8] Even the so-called luxury car segment, in which Tesla predominantly plays, its biggest competition comes from Germany – Porsche with its Taycan, Audi with the E-Tron series and Daimler's Mercedes EQC. Even in China, where Tesla has built up its third Gigafactory in just 10 months and test production has just started, dozens of direct competitors such as Byton, Wey and Hongqi are lined up in the starting blocks. Tesla's decision to produce cars in Germany means the race for electric car supremacy is now underway in the same country where the car engine was first invented.

[9] Despite many unanswered questions, the new factory is great news for people in the region. Several thousand new jobs will be created, and they couldn't come at a better time. Just south of the planned factory – in Lusatia – thousands of jobs are set to be lost as a result of the decision to phase out lignite (brown coal) extraction.

[10] Bets are now being taken on which project will be finished sooner – the new Berlin airport or Tesla's German Gigafactory.

Reading questions:
1. Why is it important for Tesla to build the new Gigafactory in Germany? [5–8]
2. Why is it important for Tesla to build the Gigafactory as fast as possible? [5–7]
3. How do the people in Brandenburg benefit from the Gigafactory? [3, 9]
4. Why is the creation of jobs through the Gigafactory so important for the region at the moment? [9]

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Source 5+

16 September 2020,
by Alex Pichaloff

Tesla's Gigafactory is Coming, but not Everyone is Happy

Some have called it a huge opportunity for the region, while others think it's a risk. One year since Tesla announced their plans to build a Gigafactory in Brandenburg, how has the US electric car giant been received in Grünheide?

[1] If you're driving along *Autobahn* 10, just to the southeast of Berlin, you can't miss it. One minute it's nothing but Brandenburger forest either side of the road, but then suddenly there's a clearing, and if you drive a little further, you see a heap of cranes, machinery and vehicles working away. This is not just any old construction site. For starters, it's big – the size of around 420 football fields, in fact. But that's not all. This area is the site of Tesla's under construction Gigafactory, which, depending on who you ask, represents either one of the biggest opportunities or one of the biggest risks to life in this idyllic pocket of Brandenburg.

[2] It all started in November last year. Elon Musk, the CEO of the US electric car giant, was in Berlin for *Das Goldene Lenkrad* vehicle awards show. As he walked on stage to accept the award for best mid-sized vehicle of the year – won by Tesla's Model 3 car – everything seemed to be going perfectly normally: He thanked his staff, the hosts of the evening and said he was thrilled about the win. But then, seemingly out of nowhere, he dropped a bombshell.

[3] "I actually have an announcement that will be hopefully well received," he said. "We've decided to put the Tesla Gigafactory Europe in the Berlin area."

[4] Speculation immediately broke out over where exactly this was going to be. More details came to light in January, when it was announced that Tesla had purchased a 300-hectare site at Grünheide for just over € 40 million. This site hugs the *Autobahn* around 30 km southeast of the *Hauptstadt*'s centre, and only 5 km from Berlin's state border with Brandenburg, near the town of Erkner.

[5] If the site seemed large, so too did the ambitions of the company, which seemed determined not to be a repeat of the Berlin Airport nightmare. Tesla officials said they planned to have the first stage of the € 4bn project completed by June 2021, by which stage the plant is expected to have the capacity to produce 500,000 Tesla Model Y vehicles per year. Tesla also said that it would have up to 12,000 workers on site, a significant figure given that the municipality of Grünheide only has a population of just under 9000.

[6] The company's announcement was largely met with praise from political figures. Not only would the factory bolster the development of electric-powered vehicles in Germany, thereby helping to meet climate goals, but the decision to use Brandenburg as a location would provide much-needed investment and economic opportunity to a region that has struggled to attract major projects since the Wende.

Wrong place, right time?

The Gigafactory's southern entrance under construction in July.

[7] Despite the initial enthusiasm, however, criticism quickly began to emerge. "When I found out in November 2019 what Tesla and the authorities were planning, I immediately decided to fight," says Grünheide local Frank Gersdorf. "It was clear to me that the nature and the livelihood of the people here would be destroyed."

[8] The 56-year-old, who was born and raised in the area, lives with his wife about 800 metres from the Gigafactory site. In January, Gersdorf and some other like-minded locals set up the *Bürgerinitiative Grünheide*, a citizens' initiative campaigning against the project. The critics have a seemingly never-ending list of concerns, ranging from infrastructure to the construction approval process and overall transparency.

[9] For most of the dissenters, the project's environmental impact has remained the primary issue. The felling of 90 hectares of pine forest in February, as part of the first stage of the project, raised concerns about the impact on local fauna. Another critical ecological factor is water. Large chunks of the proposed factory sit within a designated *Wasserschutzgebiet* (water protection zone).

[10] Specifically, the site falls across two different water protection categories – 3a and 3b – with both containing a series of rules preventing certain types of industrial activity from taking place. "The main point of criticism from our side is that the location simply isn't suitable," says Steffen Schorcht, who for the past 25 years has lived in Erkner. "We have water protection zones to minimise the risk of contaminating the groundwater," he explains. "That's why you're not allowed to build certain things within them, like a chemicals factory – and Tesla is in its character a chemicals factory."

[11] Schorcht notes that Tesla's Gigafactory would have a wide production range, meaning more activities taking place there than at Volkswagen's Wolfsburg plant, for example. "They have a painting facility there, they have an aluminium foundry," he says. "They have a lot of processes that involve chemicals, and therefore there's a risk that pollutants could be released into the groundwater."

[12] The 59-year-old electrical engineer has campaigned on water protection issues in the area for more than 20 years and is intimately familiar with the relevant laws and local history. He says his opposition to the project isn't based in ideological opposition to industry. "We don't have anything against Tesla, or the energy or transport transition – quite the opposite actually. For us, the issue is the location."

[13] The main blame, in Schorcht's opinion, lies at the hands of the SPD-led state government in Brandenburg – he feels they should never have offered Tesla the site in the first place.

[14] Not everyone in the area agrees with him: supporters of the Gigafactory project point to the fact that the site has been officially listed by the state government as a *Gewerbegebiet* (commercial zone) for around two decades. In fact, BMW came close to building their own vehicle assembly plant on the site in the early 2000s before eventually deciding on Leipzig. Schorcht, by way of rebuttal, argues that the site should not have been offered to BMW, either, and suggests that the state government's development plan for the site is likely to be challenged in court.

[15] "From our point of view, that is very legally questionable," he says. "They've tried to open a backdoor to offer Tesla something quickly so that the company builds here in Brandenburg." Exberliner contacted the press office of Jörg Steinbach, Brandenburg's minister for economy, work and industry, however he was unavailable for comment.

Tesla's black box

[16] Critics have also highlighted the construction approval process as a point of concern. Over the past year, the *Landesamt für Umwelt* – the independent body responsible for issuing environmental permits for construction projects in Brandenburg – has granted Tesla five provisional permits: these have allowed the company to clear the 90 hectares of forest and begin construction without the need for a final environmental approval.

[17] It has been pointed out that this is well within the law, under paragraph 8a of the *Bundes-Immissionsschutzgesetzt* (Federal Emission Control Act), and that numerous other projects have utilised this paragraph in the past. Yet detractors have raised ethical questions over the practice, fearing it could be used as a precedent for other major projects in the future.

[18] Sebastian Walter is one such opponent. "Yes, it has been used before," he says, "but this paragraph 8a has been used by small companies or private builders. To give out so many provisional permits for such a large project is legally possible, but I think the question should be: Is what is legally possible also.

[19] Walter, 30, is the chairman of *Die Linke*'s parliamentary group in the Brandenburg state parliament. "I find it difficult," he adds, "to think that this factory could be finished, but the final environmental assessment and the final building permit could still be awaiting approval." One potentially risky (and costly) complication of this process is that if the project's final environmental permit is denied, then Tesla would be legally responsible for dismantling the entire factory and returning the site to its previous condition – no mean feat for a 90-hectare site which, before construction began, was a pine forest.

[20] "It is very, very difficult to return the site to its original state," says Schorcht. "That's another criticism: you can't simply give out provisional permits if it's not possible to return the site to its original condition."

[21] Another bone of contention is the matter of transparency, with politicians and locals alike frustrated by the lack of information coming from the California-based company. Walter says that, while *Die Linke* certainly aren't against the project, they do have a number of questions regarding the environmental impact, working conditions at the factory and the pressure the development will place on local infrastructure and the local community – but they aren't getting anything out of Tesla.

A Tesla Factory in Fremont, USA.

[22] “There was a moment when Tesla came to parliament, and I was really happy that they were actually there,” he recounts. “But they just showed their PowerPoint presentation and no one was allowed to ask questions.”

[23] Such an approach is simply inappropriate to German parliament, Walter suggests, as it would be in the United States. “This is one of the largest economic and industrial projects of the past few decades, and you can’t just organise it all from the green table – or from Twitter, as Elon Musk does,” he says. “You have to come here and talk to the people.” Exberliner also approached Tesla for comment, but did not receive a reply to its press request.

Manufacturing consent?

[24] It would be misleading to characterise the Gigafactory story as a simple David and Goliath battle, with a money-hungry American company on one side and powerless local residents on the other. For one thing, there haven’t been any official opinion polls or research into the matter, so it has proven particularly difficult to gauge public sentiment in the region. The protests – and subsequent counter-protests in favour of the project – that took place in Grünheide in January and February also didn’t seem to shed much light. Many complained that the majority of those present weren’t from the region at all, with some demonstrators coming from as far and wide as Berlin and Bavaria.

[25] Different stakeholders have varying perceptions of public opinion. Schorcht and Gersdorf are convinced that opposition to the project is growing, based on increased contact they’ve been receiving from concerned locals and the development of other citizens’ initiatives in the area. In advance of public meetings between Tesla and locals in September, it was revealed that 414 groups and citizens had submitted official objections to the project. Gersdorf believes that local opinion has been misrepresented by politicians – in their staunch support of the project – and the German press, by not reporting objectively enough.

[26] “The mood was artificially pushed in a positive direction from the very beginning,” he argues. “Statements like, ‘This is like drawing the six in the lottery’, or that the project was of ‘national and even international importance to Germany’, silenced a lot of critics.”

[27] Others see the situation differently, however. Christine de Bailly runs the local Netz-Werk-Laden in Grünheide, a volunteer-run community centre located in the town’s Marktplatz. Since January, the Netz-Werk-Laden has hosted weekly Tesla information evenings on Tuesdays from 5 to 7pm, where two communications consultants contracted by Tesla are on hand to answer questions and provide updates on the project.

[28] De Bailly says the role of the information evenings isn’t to convince people of the virtues of the project, but simply to inform people of what is going on and let them make up their own minds. De Bailly feels that public sentiment has shifted throughout the year, with occasional

outright resistance – many locals were concerned about the impact of clearing the forest at the site – now largely replaced by a sense of cautiousness, even curiosity.

[29] “There are a lot of people who like to drive past and see how it’s coming along, how quickly it’s growing,” she says. “‘What’s happening? How’s it looking? Will we get jobs?’ People are asking these types of things.”

[30] Regardless of where the majority stands, it’s clear that a number of Grünheide residents are supportive of the project. De Bailly, for one, is hopeful the factory will act as a kind of accelerator to help boost infrastructure and connectivity in the area. “It’s long overdue,” she says. “We’ve been working for a long time, trying to get the train to stop here more often and improve the bus services.”

[31] Another local at ease with the project is Lukas Haiß. The 27-year-old says that, while he’s not particularly enthusiastic about the Gigafactory, he is comfortable with the development going ahead.

[32] “The site has been classified as a commercial zone for a long time, and I think it’d be good if we could use it for that purpose,” he argues. “As for the fact that it’s Tesla, that doesn’t really interest me personally, but I like the sustainability aspect, in the sense of more investment in electric mobility and research and development.”

[33] It has been 12 months since Elon Musk walked on stage and broke the news that Tesla was coming to Brandenburg. In the past year, a lot has happened in Grünheide: protests, community engagement and a massive construction site – not to mention the Corona pandemic. Still, with Tesla pushing full steam ahead with construction, and opponents determined to stand their ground, it seems the saga of Grünheide’s Gigafactory will play on for a while yet.

Reading questions:
1. Who are the parties involved in the discourse on the project “Tesla´s Gigafactory“?
2. Who is (un)happy with the project? Note for each party in a few words what position they take concerning the topic.
3. What are possible opportunities and positive changes for the region? [6, 30]
4. What direct impact on the environment does the project have? [9, 16–20]
5. What may be further potential risks of the project? [10 f.]
6. What is the expected impact of the project on the local community? [5, 7, 21, 29]

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Source 6+

3 January 2022,
by Nathan Eddy

German Union Steps Up Efforts to Recruit Tesla Workers with Office near Berlin Plant?

IG Metall says automaker offers lower pay than German rivals.

About 12,000 employees are expected to build up to 500,000 electric cars a year in Gruenheide, with production expected to start early this year.

[1] BERLIN – IG Metall, the dominant metalworkers' union in Germany, wants to represent as many employees as possible at Tesla's new factory in near Berlin. The union has opened an office "very close" to the factory in Grünheide, its district leader for Berlin, Brandenburg and Saxony, Birgit Dietze, said.

[2] Besides supporting the election of a works council, the union will be available to answer questions on topics including pay, working hours and employment contracts, Dietze told the German Press Agency (DPA).

[3] Tesla CEO Elon Musk has had a rocky relationship with organized labor in the past and was ordered in March last year to delete a tweet from 2018 threatening to strip U.S. employees of their stock options if they formed a union.

[4] IG Metall has said job applicants have told them that the automaker is offering pay 20 percent below the collectively bargained wages paid by German automakers. Tesla is also shaking up conventional German contracts by offering packages with stock options and bonuses rather than predetermined holiday pay.

[5] Musk has made his irritation for German laws and processes known, saying in a letter to authorities in April that the country's complex planning requirements were at odds with the urgency needed to fight climate change. The automaker has repeatedly had to push back the expected opening of the factory due to environmental objections and red tape.

[6] In the future, about 12,000 employees are expected to build up to 500,000 electric cars a year in Gruenheide, with production expected to start early this year. The union understands that 1,800 workers had been hired by Christmas, the DPA reported. "We assume that the first production stage will start with about 6,000 employees," Dietze told the news outlet. She also pointed out additional players in the automotive industry will be established around the plant. "In terms of transformation, it is necessary to take the employees with us," Dietze said. "We are not the dinosaurs of the industrial age but are looking forward in a progressive way. We are actively intervening in the issues of shaping industrial policy."

[7] Should collective bargaining one day occur between the union and Tesla, one point of contention would already be foreseeable. According to her findings, part of Tesla's compensation should be achieved through stock options, Dietze told the DPA. "Optionally, on top of a

secured collective bargaining standard like that of the metal and electrical industry, we would have no objection," the trade unionist said. "But what generally does not work in our members' estimation is that parts of the remuneration are so thoroughly flexible that the employee does not know exactly what is coming out for them at the end of the month or the year?"

Reading questions:
1. What is the metalworker's union (IG Metall) for? [1 f.]
2. How do workers profit from the union? [6 f.]
3. What has Tesla's relationship with unions been like in the past? [3]
4. How does Tesla pay its employees? [4, 7]
5. How do the employment contracts differ from other German contracts? [4, 7]

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Material 12: Glossary – *Geographical Terms*

annual mean temperature (*n*): the average temperature of the air as indicated by a properly exposed thermometer during a given time period, usually a day, a month, or a year (1)

aquatic (*adj*): having to do with water (6)

aquatic ecosystem (*n*): a freshwater or marine ecosystem (see ecosystem) (6)

aquifer (*n*): an underground layer of rock or earth which holds groundwater (6)

biodiversity (*n*): the existence of a wide variety of plant and animal species in their natural environment (4)

catchment area (*n*): the area drained by a river; in physical geography, an alternative term to *river basin* (4)

climate change (*n*): Climate change is a long-term shift in global or regional climate patterns. Often climate change refers specifically to the rise in global temperatures from the mid-20th century to present. (7)

conservation (*n*): the management of a natural resource to prevent exploitation, destruction, or neglect (6)

contamination (*n*): a state of being soiled, stained, corrupted, or infected by contact or association (6)

deforestation (*n*): the practice of clearing trees. Much deforestation is a result of development pressures, e.g., trees are cut down to provide land for agriculture and industry. (3)

desiccation (*n*): Desiccation refers to the state, the act, or the process of removing or extracting water content thoroughly resulting in extreme dryness. (2)

drainage (*n*): the removal of water from the land surface by processes such as stream-flow and infiltration (4)

drought (*n*): a prolonged period where rainfall falls below the requirement for a region (4)

dry spell (*n*): a period of rainfall below a specified amount. The specific period and amount of rainfall vary depending on the particular activity under discussion. (1)

ecohydrology (*n*): understanding of relationships between hydrological (water) and biological processes at different scales (10)

ecosystem (*n*): community and interactions of living and nonliving things in an area / a geographic area where plants, animals, and other organisms, as well as weather and landscapes, work together to form a bubble of life (6)

ecosystem services (*n*): benefits humans and human communities receive from healthy, functioning natural ecosystems (6)

environment (*n*): physical surroundings: soil, vegetation, wildlife and the atmosphere (4)

evaporation (*n*): the process whereby a substance changes from a liquid to a vapour. Heat from the sun evaporates water from seas, lakes, rivers, etc., and this process produces water vapour in the atmosphere. (4)

evapotranspiration (*n*): loss of water from the earth's soil by evaporation into the atmosphere and transpiration by plants (6)

freshwater ecology (*n*): Freshwater ecology focuses on the relations of aquatic organisms to their freshwater habitats. (2)

groundwater (*n*): water held in the bedrock of a region, having percolated through the soil from the surface. Such water is an important resource in areas where surface run-off is limited or absent. (4)

groundwater body (*n*): a distinct volume of groundwater within an aquifer or system of aquifers, which is hydraulically isolated from nearby groundwater bodies (5)

habitat (*n*): a preferred location for particular species of plants and animals to live and reproduce (4)

hydrography (*n*): measurement and study of the surface waters of the Earth (6)

infrastructure (*n*): the basic structure of an organization or system. The infrastructure of a city includes, for example, its roads and railways, schools, factories, power and water supplies. (4)

irrigation (*n*): watering land, usually for agriculture, by artificial means (6)

limnology (*n*): the study of freshwater (inland) ecosystems (6)

pollutant (*n)*: chemical or other substance that harms a natural resource (6)

pollution (*n*): introduction of harmful materials into the environment (6)

precipitation (*n*): all forms in which water falls to Earth from the atmosphere (6)

river basin (*n*): the area drained by a river and its tributaries (a stream or river which feeds into a larger one), sometimes referred to as a *catchment area* (4)

long term drought (*n*): prolonged period where rainfall falls below the requirement for a region. (4) A drought is typically considered long-term after a duration of six months. (8)

sensitive habitat (*n*): a preferred location for particular species of plants and animals to live and reproduce which is sensitive to environmental changes (4)

stockbroker belt (*n*): an area near cities where many rich people live in large houses and from where they travel to work in the city (3)

surface water / water body (*n*): part of the hydrosphere located on Earth, such as oceans, lakes, and rivers (6)

urbanisation (*n*): the process by which a national population becomes predominantly urban through a migration of people from the countryside to cities, and a shift from agricultural to industrial employment (4)

vulnerability (*n*): Vulnerability is a measure of the extent to which a community, structure, service or geographical area is likely to be damaged or disrupted, on account of its nature or location, by the impact of a particular disaster hazard. (9)

water scarcity (*n*): a situation when the amount of water available does not meet the amount of water needed or wanted by a population (6)

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Material 13: Worksheet – *Geographical Terms*

1) Match the geographical terms and their definitions.

1. biodiversity
2. climate change
3. deforestation
4. drought
5. ecosystem
6. environment
7. groundwater
8. infrastructure
9. pollution
10. vulnerability

a. a prolonged period where rainfall falls below the requirement for a region

b. the basic structure of an organization or system

c. water held in the bedrock of a region, having percolated through the soil from the surface

d. a long-term shift in global or regional climate; refers specifically to the rise in global temperatures from the mid-20th century to present

e. a measure of the extent to which a community, structure, service, or geographical area is likely to be damaged or disrupted, on account of its nature or location, by the impact of a particular disaster hazard

f. community and interactions of living and nonliving things in an area / a geographic area where plants, animals, and other organisms, as well as weather and landscapes, work together to form a bubble of life

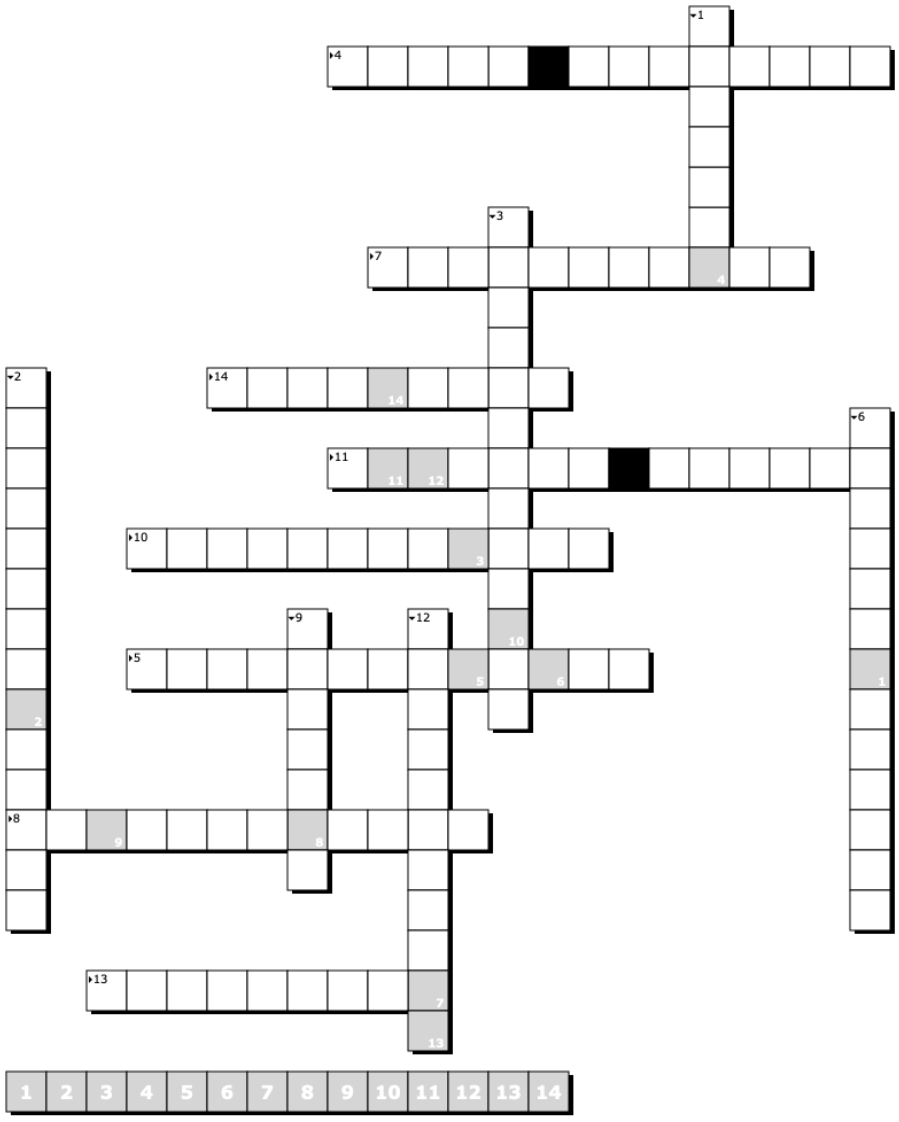
g. introduction of harmful materials into the environment

h. the practice of clearing trees / cutting down trees to provide land for agriculture and industry

i. the existence of a wide variety of plant and animal species in their natural environment

j. physical surroundings: soil, vegetation, wildlife, and the atmosphere

2) Write the right geographical terms into the crossword puzzle.



1 A prolonged period where rainfall falls below the requirement for a region.

2 The basic structure of an organization or system.

3 A measure of the extent to which a community, structure, service, or geographical area is likely to be damaged or disrupted, on account of its nature or location, by the impact of a particular disaster hazard.

4 Situation when the amount of water available does not meet the amount of water needed or wanted by a population.

5 A state of being soiled, stained, corrupted, or infected by contact or association.

6 The practice of clearing trees; much deforestation is a result of development pressures, e.g., trees are cut down to provide land for agriculture and industry.

7 Water held in the bedrock of a region, having percolated through the soil from the surface; such water is an important resource in areas where surface run-off is limited or absent.

8 The process by which a national population becomes predominantly urban through a migration of people from the countryside to cities, and a shift from agricultural to industrial employment.

9 A preferred location for particular species of plants and animals to live and reproduce.

10 The existence of a wide variety of plant and animal species in their natural environment.

11 A long-term shift in global or regional climate patterns. Often refers specifically to the rise in global temperatures from the mid-20th century to present.

12 Physical surroundings: soil, vegetation, wildlife, and the atmosphere.

13 Introduction of harmful materials into the environment.

14 Community and interactions of living and nonliving things in an area / a geographic area where plants, animals, and other organisms, as well as weather and landscapes, work together to form a bubble of life.

Created with XWords (https://www.xwords-generator.de/de)

Material 14: Worksheet – *Argumentation Types*

Read the following description of the different types of argumentation schemes closely. Afterwards do the exercises below.

Reasoning from sign

Scheme: Statement A (sign) is true in this situation. Statement B is generally indicated as true when its sign, A, is true. Therefore, B is true in this situation.

"The street is wet. I suppose it must have rained."

In this type of argumentation, a conclusion is drawn from a premise. The conclusion serves as the best explanation in a certain situation.

Critical question: Are there any other possible conclusions (explanations)?

Reasoning from authority

Scheme: Source A is an authority/expert in subject domain containing proposition X. A asserts that proposition X is true. Therefore, X may plausibly be taken to be true.

"Environmental scientists argue that a general speed limit on the *Autobahn* could help slow down climate change."

There is a natural tendency to respect experts and to refer to them. However, experts are not omniscient.

Critical questions:	How credible is A as an expert source? Is A an expert in the field that the proposition X is in? What did A assert that implies X? Is A personally reliable as a source – for example, is A biased? Is X consistent with what other experts assert? Is A's assertion based on evidence?

Reasoning from analogy

Scheme: Generally, case C1 is similar to case C2. Proposition A is true in case C1. Therefore, A is also true in case C2.

"Since the podium discussion about sustainability last week was very interesting, I suppose this week's discussion about reducing emissions will be great, too."

In an argumentation from analogy, one case is compared to another, and they are judged similarly. Overgeneralisation can make such arguments misleading or even false. It can't be concluded that, if C1 and C2 have some characteristics in common, any further characteristics are also true for both cases.

Critical questions:	Is A true in C1? Are C1 and C2 similar, in the respects cited? Are there important differences between C1 and C2? Is there some other case C3 that is also similar to C1 except that A is false in C3?

Reasoning from popular opinion

Scheme: Everybody accepts A. Therefore, A is true.

"Everyone believes the earth is flat. Therefore, the earth is flat."

The *argumentum ad populum* is based on the opinion of the majority. It often contains rhetorical and emotional power. It can be reasonable in some cases, but it may also be misused.

Critical question:	Is this common belief based on any evidence?

***Ad hominem* argument**

Scheme: A is a person of bad character. Therefore, what A says should not be accepted as plausible.

"It's pretty obvious that your political party can't be trusted with acting responsibly regarding the protection of the environment, so I won't expect any reasonable action from you either."

This type of argumentation uses a personal attack on the interlocutor's character to discredit their argument. The credibility of the arguer is, for instance, questioned by their alleged lack of veracity, cognitive skills, or moral. From this, the lack of worth of the original argument is inferred. Such line of argumentation can also be used to value an argument: "B is very intelligent. Hence, what B says must be true."

It often doesn't address the actual issue that is being discussed.

Critical questions:	Is character relevant in the dialogue? Is A a person of good/bad moral character? Is their enough evidence given to underpin this presumption? Is the conclusion that the argument/thesis X should be rejected even if other evidence to support X has been presented, or is the conclusion merely (the relative claim) that X should be assigned a reduced weight of credibility?

Subtype: *Tu quoque*

Example: “We need to use more public transport to reduce pollution.” “You also drive your car a lot!”

Tu quoque (“you also”) is used to seemingly rebut the opponents’ accusation by pointing to incoherence in their own actions or words. It is often used as a response to an *ad hominem* argument.

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Exercises

1) Match the example statements to the right category. Can you think of further examples for each category?

1. “Elon Musk is generally believed to be one of the best entrepreneurs of our time.”	a. reasoning from sign
2. “My flat mate tells me to save water by taking shorter showers, but he showers longer than I do.”	b. reasoning from authority
3. “Scientists found that reducing CO2 emissions can slow down climate change.”	c. reasoning from analogy
4. “Given Donald Trump’s offensive statements about women, Mexicans and journalists, we do not need to seriously consider his views on climate change.”	d. reasoning from popular opinion
5. “There’s a lot of noise on the street. It must be a global climate strike today.”	e. *ad hominem* argument

2) How valid or useful are the following statements? What may be fallacies in these cases? Explain your answers.

a. “All Teslas are electric cars; therefore, all electric cars are Teslas.”

b. “Building windmills everywhere would be absolute madness.”

c. “We need to foster renewable energy in order to reduce our CO2 emission.” “And what about the rising rents in the city?”

d. “Many people who live in Berlin voted for the Green Party. Thus, living in Berlin makes you vote for the Greens.”

Material 15: Worksheet – *Discussion Phrases* A

Asking for opinions

- What do you think?
- How do you feel about …?
- What is your opinion on …?
- Would anyone like to comment on …?

Giving your opinion

- strong expressions: I am convinced (that) … / I strongly believe (that) …
- neutral expressions: I think/feel (that) … / In my opinion/view … / I would argue (that) …
- tentative expressions: It seems to me that … / I tend to think that …

Agreeing and disagreeing

- I (strongly/entirely/completely) agree with/that …
- I partly agree that …
- That may be true, but …
- I think that's debatable.
- You may be right (but …).
- I (strongly) disagree with/that …

Giving examples

- As an example, … / for example
- In the instance of … / for instance
- to illustrate
- specifically
- in particular
- namely
- such as
- like

Transitioning

- also
- furthermore
- additionally
- besides that
- equally as important
- similarly
- as a result
- otherwise
- however
- firstly … secondly

Contrasting

- on the one hand … on the other hand
- nevertheless
- despite / in spite of
- yet
- conversely
- instead
- unlike
- while/whereas
- opposed to

Referring to external sources

- According to …
- Referring to …
- Studies have shown/suggest (that) …
- Scientists are convinced (that) …
- From the point of view of X, …

Drawing conclusions

- In conclusion, I'd like to say (that) ...
- I've come to the conclusion (that) ...
- Generally speaking, …
- In the end, …
- All the factors considered, …
- For this reason, I think/suppose (that) ...
- Therefore, ...

Material 15: Worksheet – *Discussion Phrases* **B**

Assign the following categories to the phrases below: asking for opinions – giving your opinions – agreeing – disagreeing – giving examples – transitioning – contrasting – referring to external sources – concluding.

Phrase	**Category**
I entirely disagree with your statement.	
I'm convinced (that) …	
Referring to …	
Can you comment on that?	
On the one hand … on the other hand …	
Furthermore, …	
for instance	
I completely agree with what you have said.	
I strongly believe (that) …	
I partly agree that …	
To illustrate my point, …	
What is your opinion on …?	
Experts are convinced (that) …	
Besides that …	
All the factors considered, …	
Generally speaking, …	
I think that's debatable.	

Material 16: Word Box – *Just a Minute*

Choose or draw a word and tell your fellow students about the topic for “Just a Minute”.

electric mobility	climate change
water	resources
deforestation	wastewater
contamination	air pollution
renewable energy	fossil fuel
conservation	environmental sustainability
social sustainability	economic sustainability
drought	water management
…	…
…	…
…	…
…	…
…	…

Material 17: Evaluation Sheet – *Self-Assessment for Students*

Name: Date:

Indicate on the scale (1 – very low, 5 – no problem) how you would evaluate your skills at the beginning and at the end of the course to make your progress visible (O = at the beginning, ☆ = at the end). If you want to, discuss the results of your self-evaluation with your course teacher.

Language	
1) I can use subject-specific language of geography.	1 2 3 4 5
2) I can present subject-specific content in a structured way.	1 2 3 4 5
3) I can effectively communicate in English with my partners during group work.	1 2 3 4 5
4) I can express my opinion and arguments using language that is appropriate to the context.	1 2 3 4 5
5) In discussions, I can use typical discussion phrases.	1 2 3 4 5
6) I can talk spontaneously about the topic of the module.	1 2 3 4 5
7) I can react spontaneously to what others say in a discussion.	1 2 3 4 5

Content	
1) I know about the three spheres of sustainability and their relation to each other.	1 2 3 4 5
2) I can evaluate the new Tesla factory project regarding sustainability using conceptual geographical knowledge.	1 2 3 4 5
3) I feel confident that I can evaluate and discuss similar projects regarding sustainability.	1 2 3 4 5

Social	
1) I actively contribute to organising group work.	1 2 3 4 5
2) I effectively cooperate with other students in finding solutions for the given tasks.	1 2 3 4 5
3) I can engage confidently in discussions with others.	1 2 3 4 5

Consider how you can use your strengths to contribute to further course work and also to promote your own language learning.

2.5.4 Appendix

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Figure 1: Adapted from Rodriguez, S. I., Roman, M. S., Terry, E. H., & Sturhahn, S. C. (2002, April). *Venn-diagram Displaying the Spheres of Sustainability* [Diagram]. In *Sustainability Assessment and Reporting for the University of Michigan's Ann Arbor Campus* (p. 8). Retrieved March 21, 2022, from https://css.umich.edu/sites/default/files/css_doc/CSS02-04.pdf

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